TECHNOLOGY DEPT.

Gas Journal

VOL. 283. 107th YEAR. LONDON, JULY 13, 1955. Nº 4806. PRICE 1/3

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Simple and robust construction, precise manufacture to carefully selected tolerances and strict concentricity throughout. The generated tooth-form gearing and essential working parts are totally enclosed in a grease-filled gearbox designed to ensure free operation. Care has been taken to prevent the possibility of corrosion and foreign matter affecting the mechanism over long periods under adverse working conditions.

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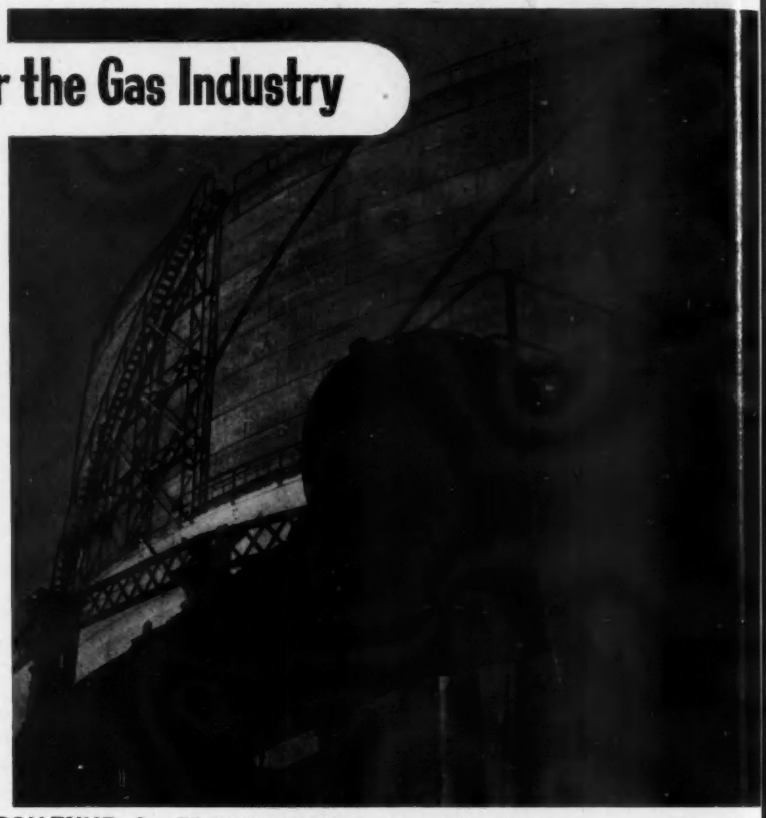

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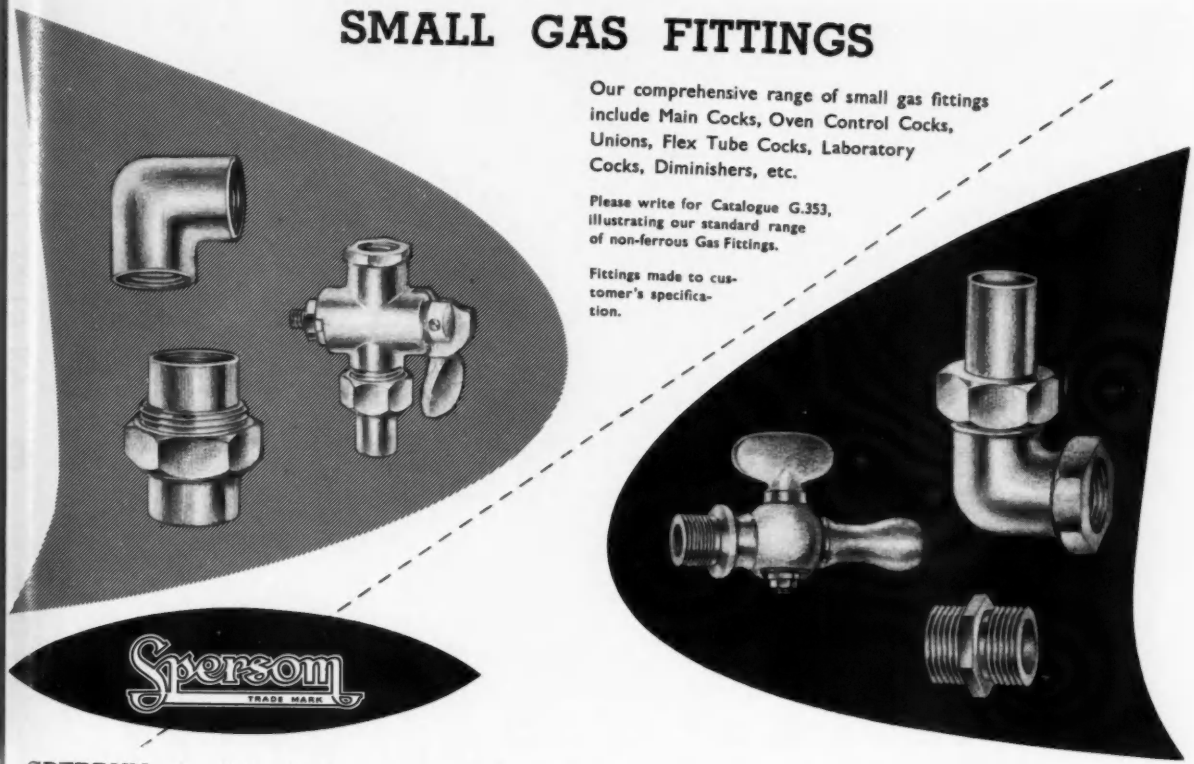

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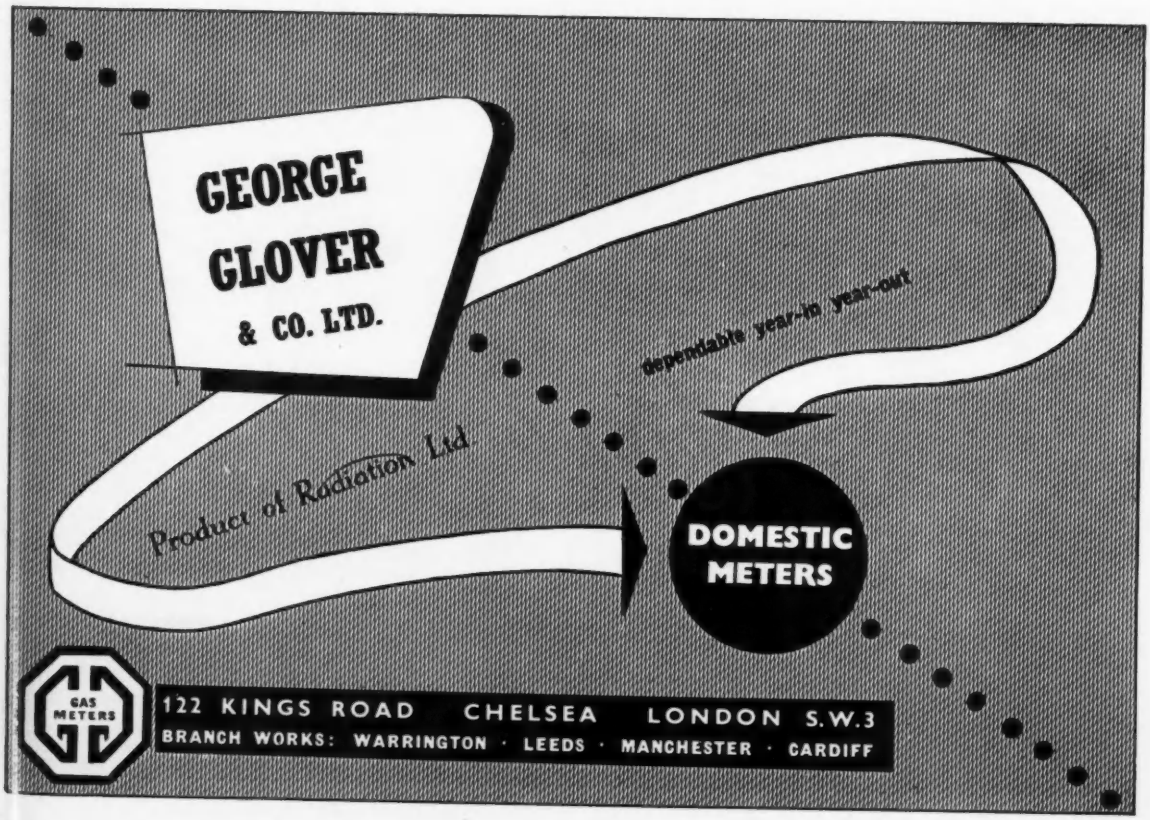

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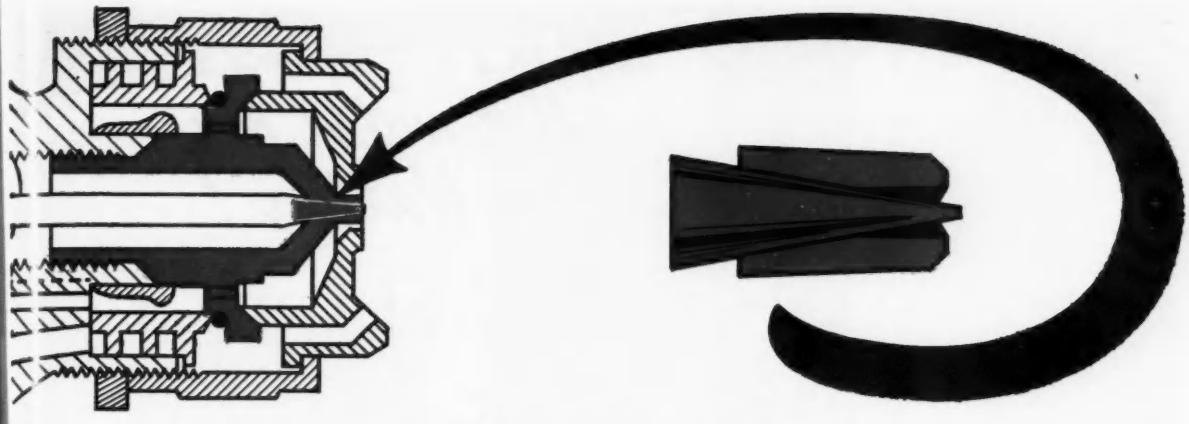

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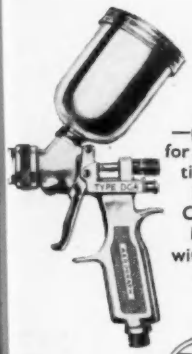

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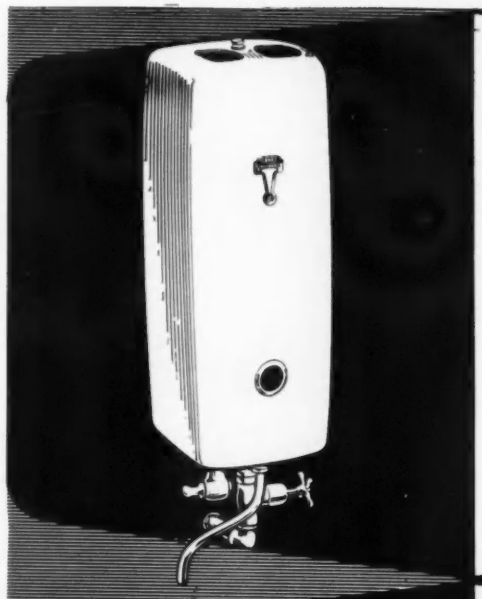

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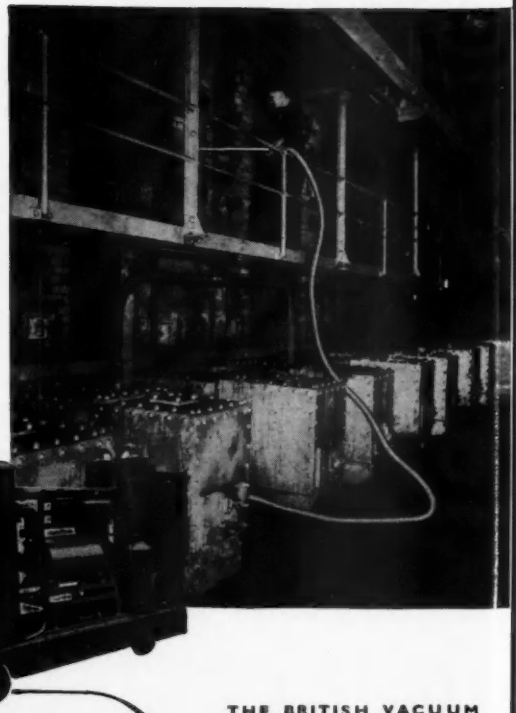
The illustration shows Redditch Gas works where a portable B.V.C. machine operates through an installed pipe system. Full particulars of these and other installations on request.



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He is best remembered for his first public gas lighting display at Carlton House and along Pall Mall.

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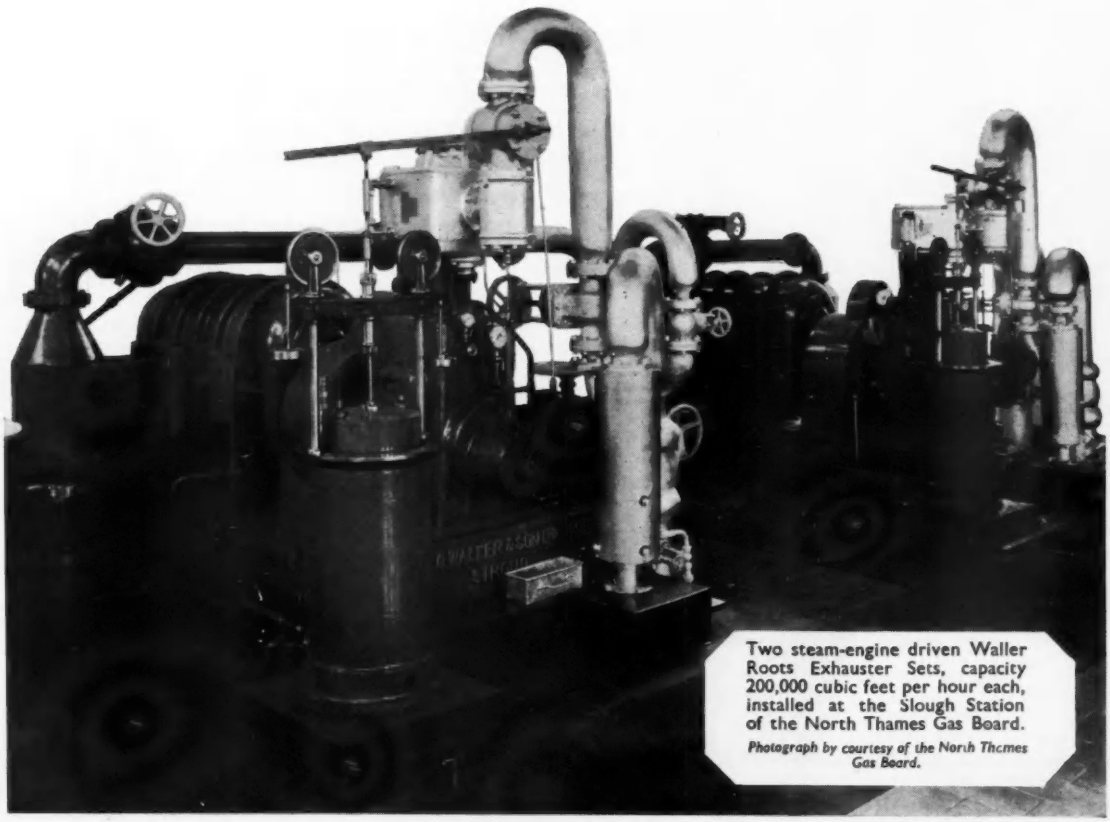

Two steam-engine driven Waller Roots Exhauster Sets, capacity 200,000 cubic feet per hour each, installed at the Slough Station of the North Thames Gas Board.

Photograph by courtesy of the North Thames Gas Board.

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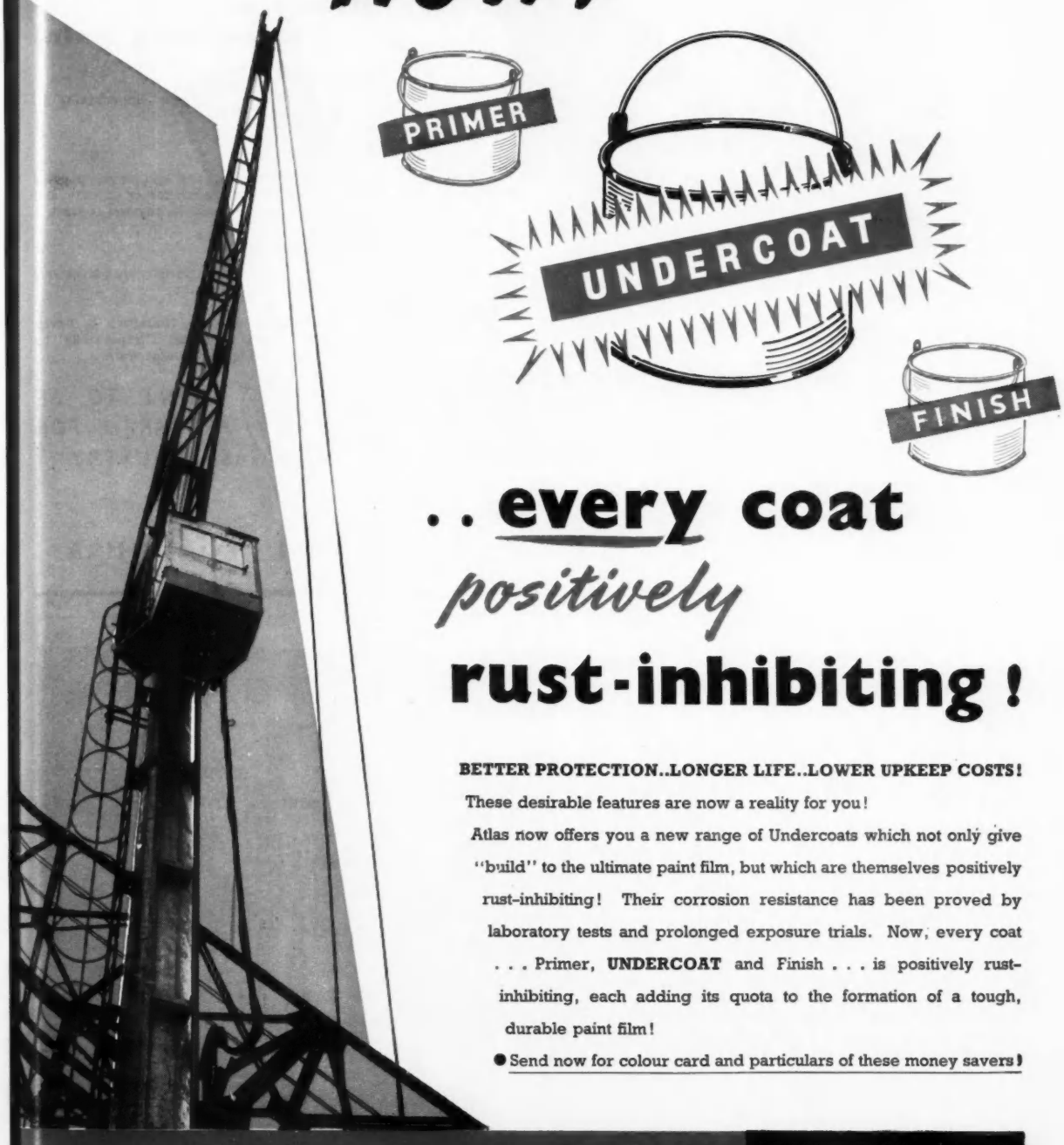

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B470

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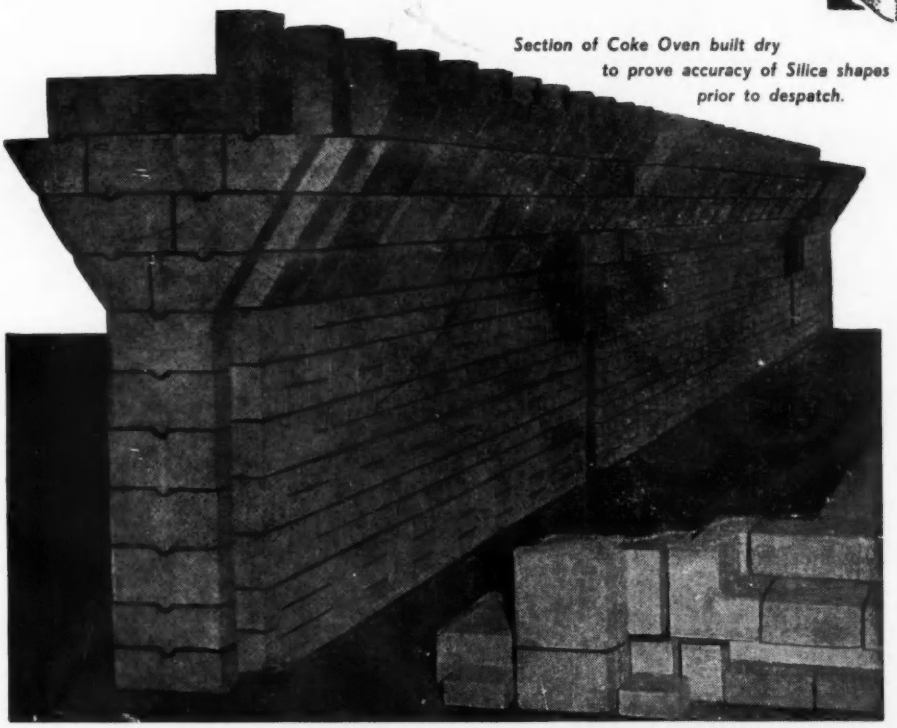

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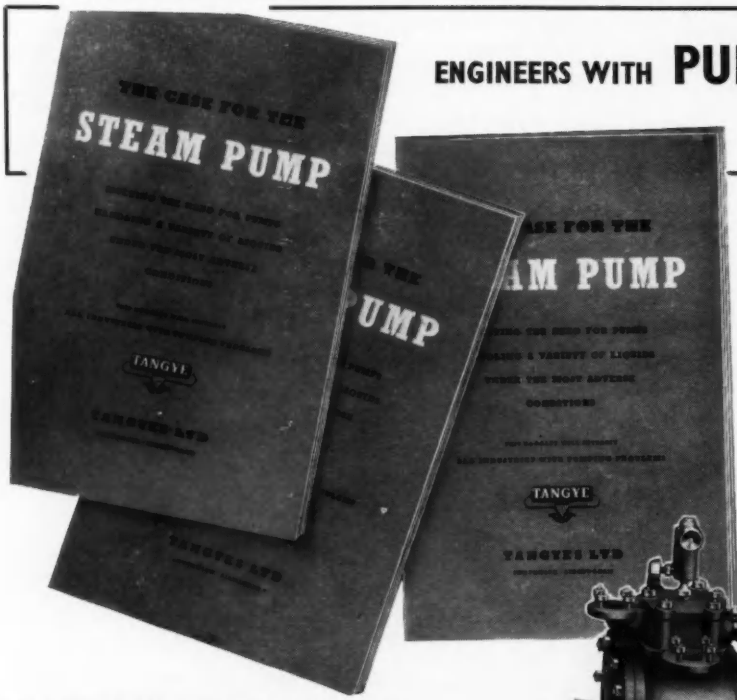

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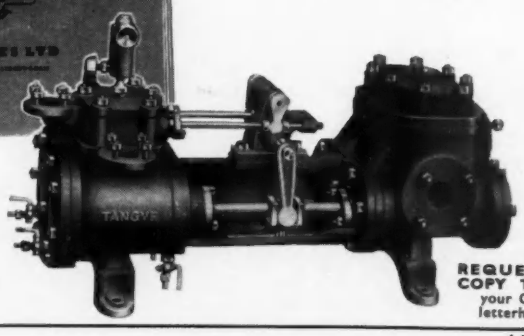

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A.S.E.F.—H.Q. Palermo, Tuesday—At 8.30 a.m. yesterday an all-out attack was launched on a heavy concentration of the enemy scale found skulking in many sectors of the city's gas mains. Directed by that veteran victor of scale wars, General Descaling, the offensive continued all day, while the townspeople of this ancient city went about their business unaware of the battle raging beneath their feet.

After advancing through 35,278 rugged metres, all pockets of resistance were liquidated and huge deposits of the enemy fell into the hands of the victorious Anti-Scale Expeditionary Force. There was public rejoicing in the streets of Palermo when the mains were declared liberated and normal gas supplies restored.

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Two of the victors show a typical example of the resistance encountered.

Viva il Generale!

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. . . sized and priced for the majority of homes

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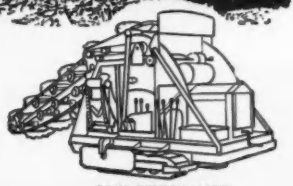

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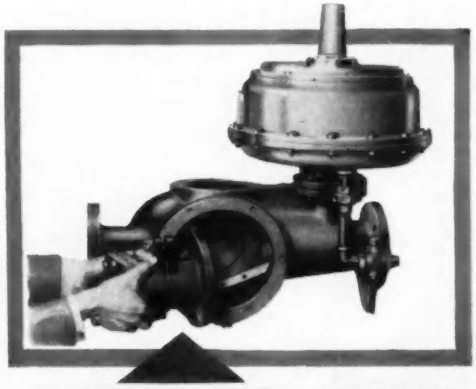

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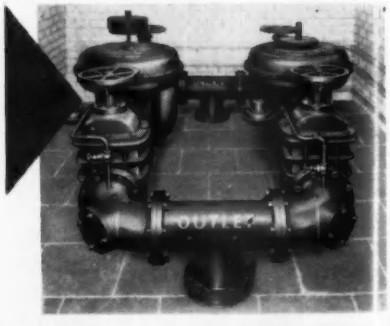

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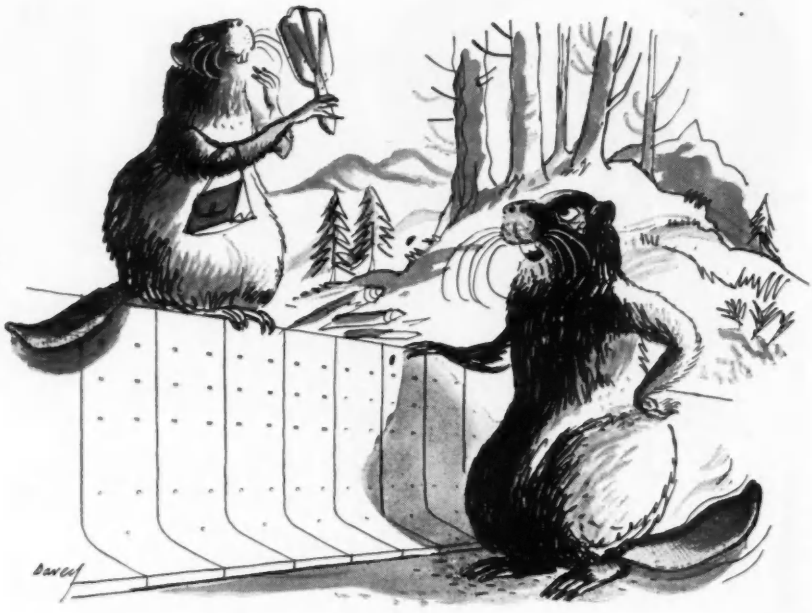
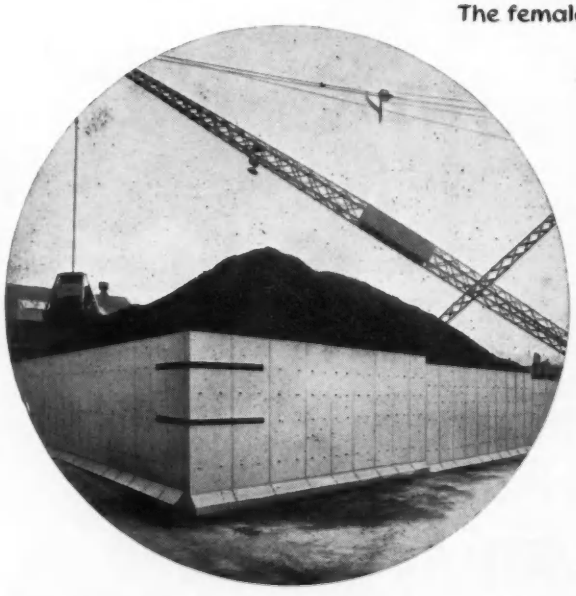
B

Brainy as a Beaver



"The beaver is noted," says the reference book: "for great intelligence, glossy fur and its skill in building dams." Beavers and businessmen both have storage problems on their hands. Industrialists who work like beavers are noted for their great intelligence and skill in using Stelcon units. The female industrialist has the glossy fur – usually mink!



Like all good ideas, Stelcon Storage Walls are simple and eminently practical. The reinforced concrete units can easily be set up and stand side by side, their special heel and toe design making the weight of stored material anchor them in position. They're safe, permanent — but easily taken up and re-erected elsewhere or re-positioned as required. Using Stelcon Walls means increasing storage capacity by up to 170%!

The illustration (left) shows a coal-storage installation at the Glasgow Glass works of Chance Brothers Limited.

Stelcon STORAGE WALLS

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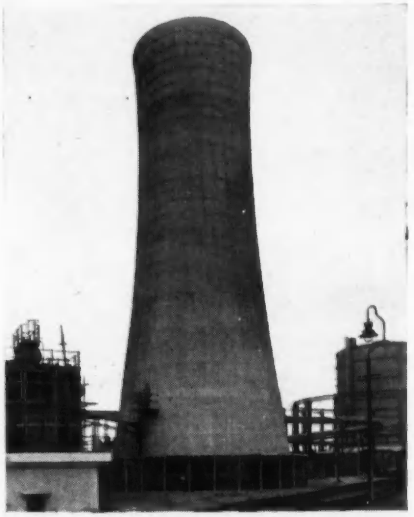
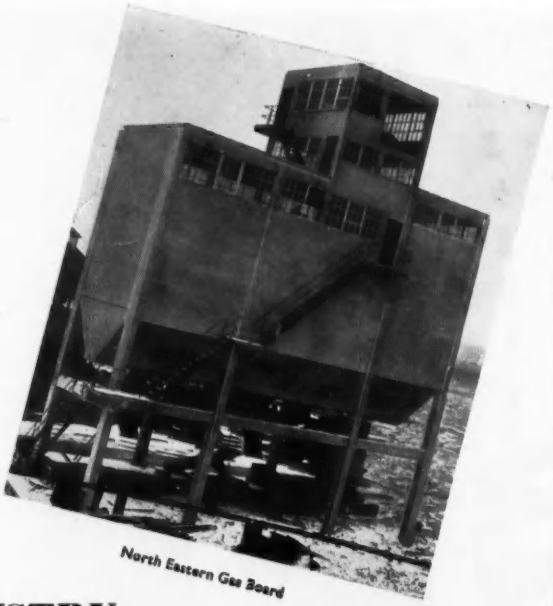


North Thames Gas Board



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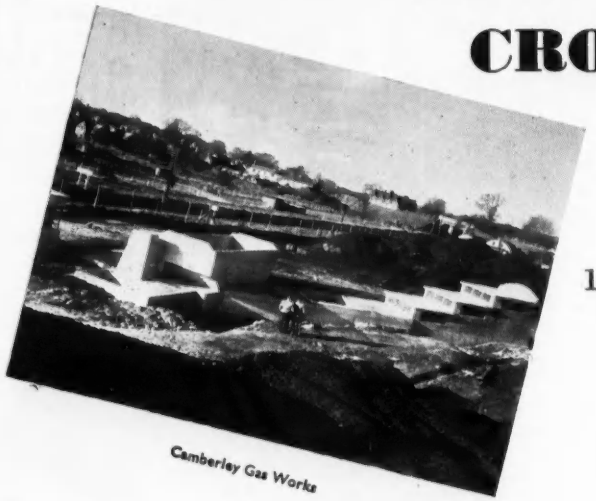

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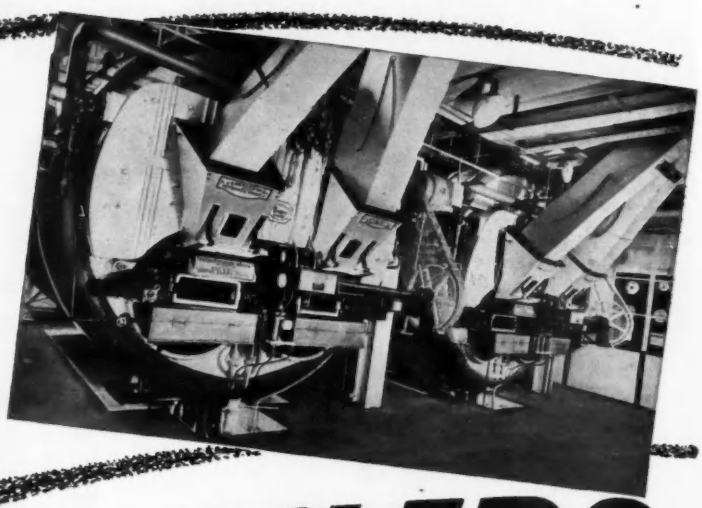

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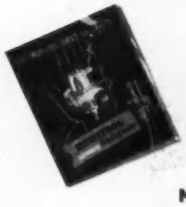

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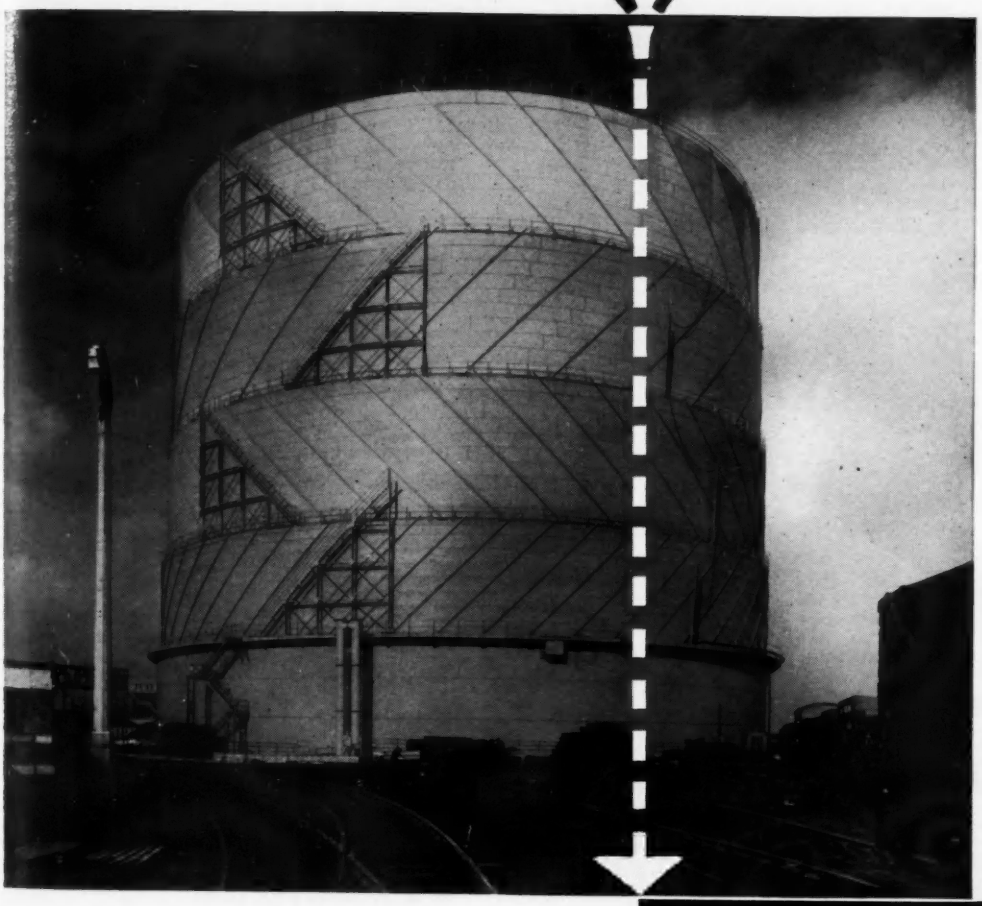

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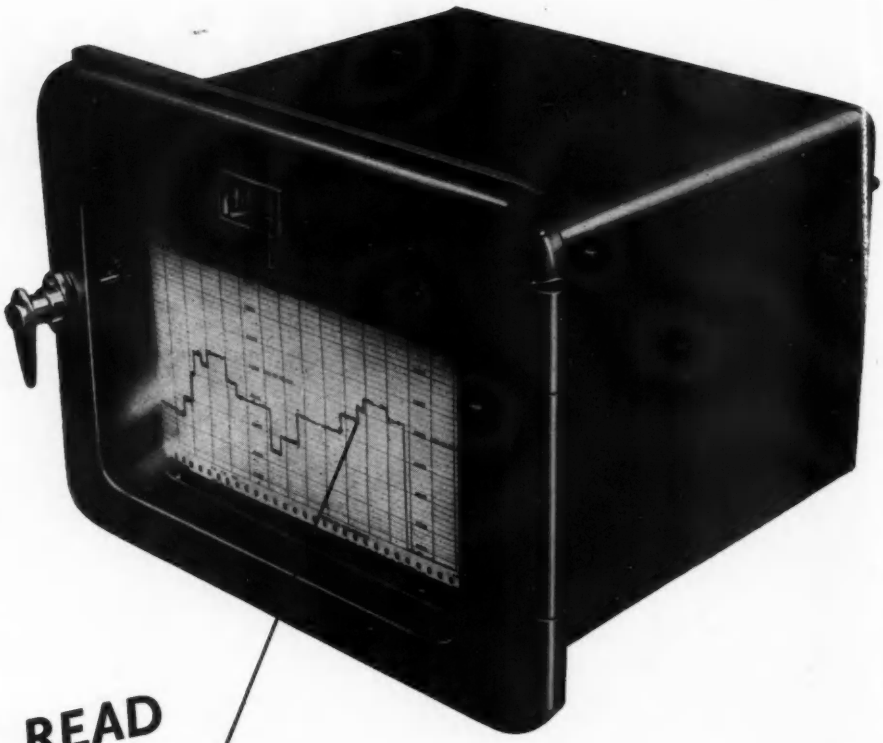

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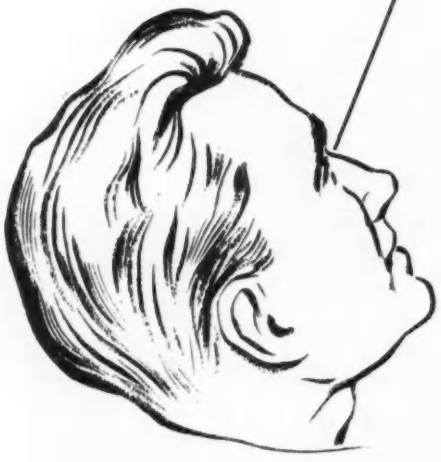

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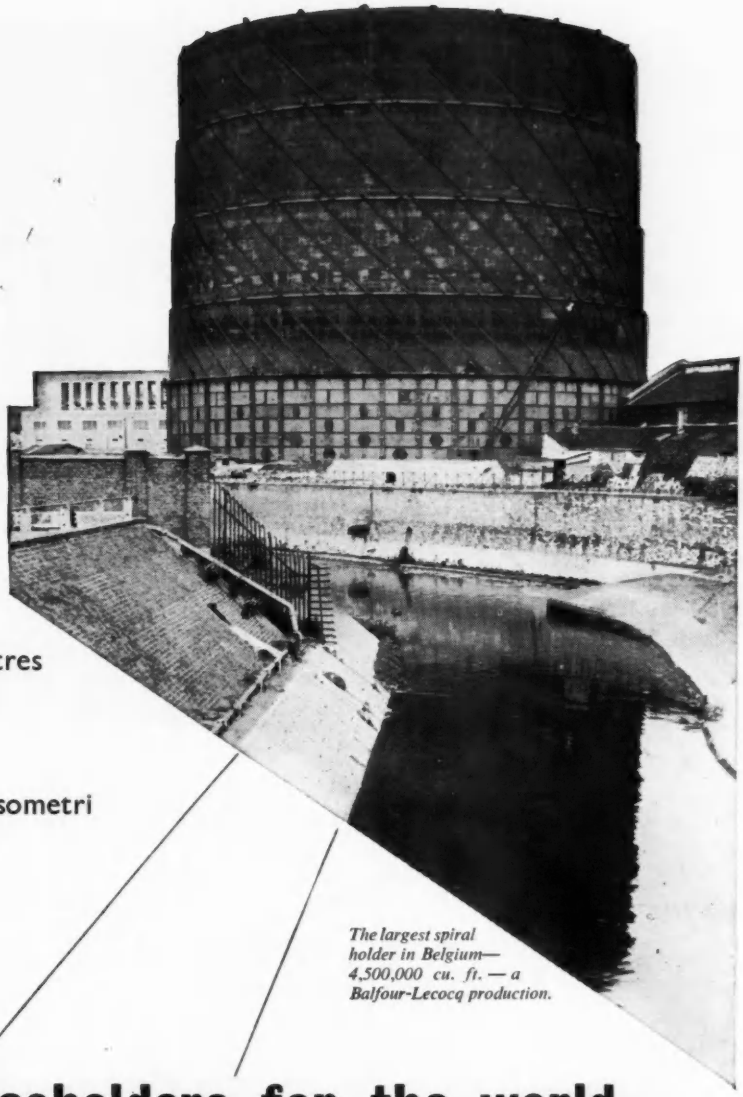

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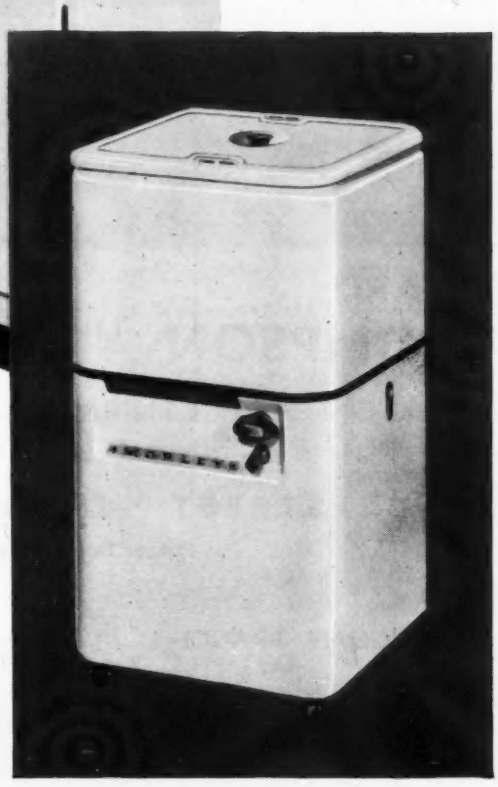

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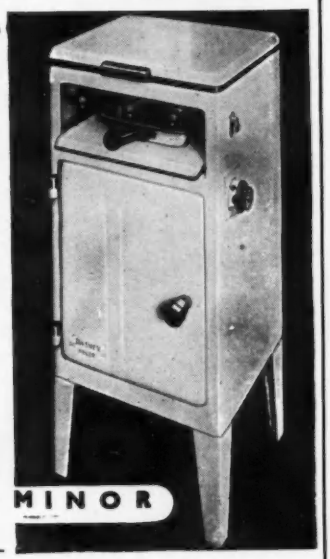

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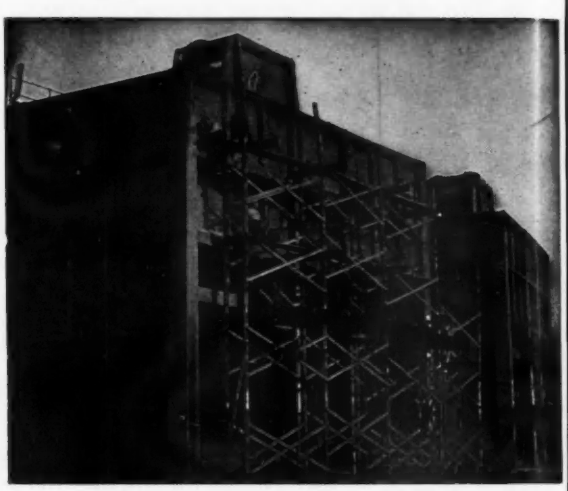

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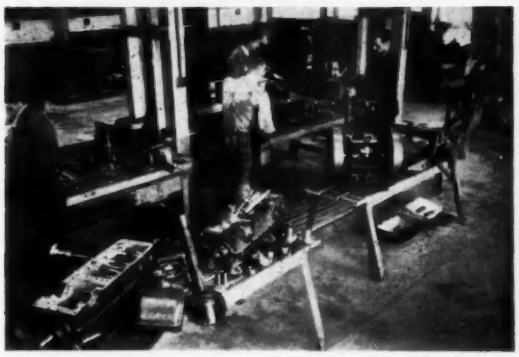

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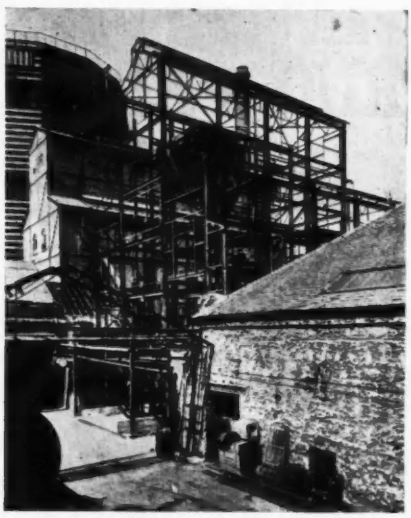

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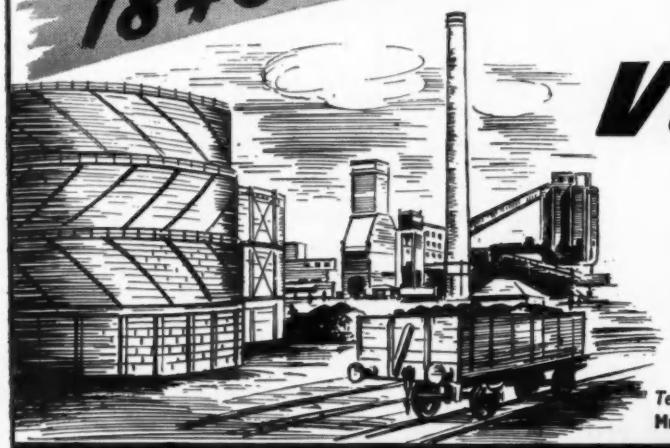

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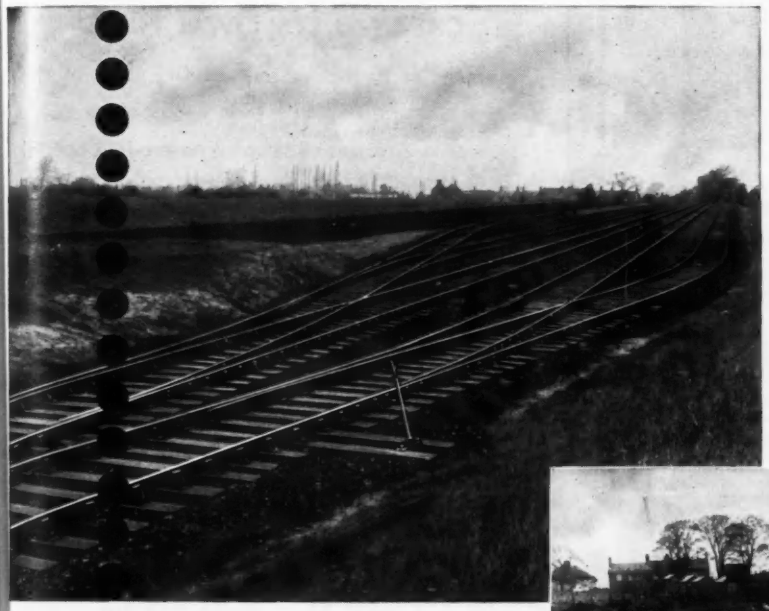

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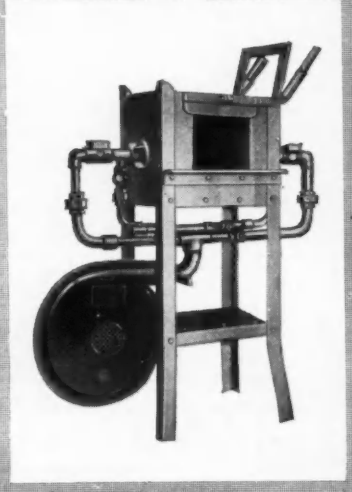

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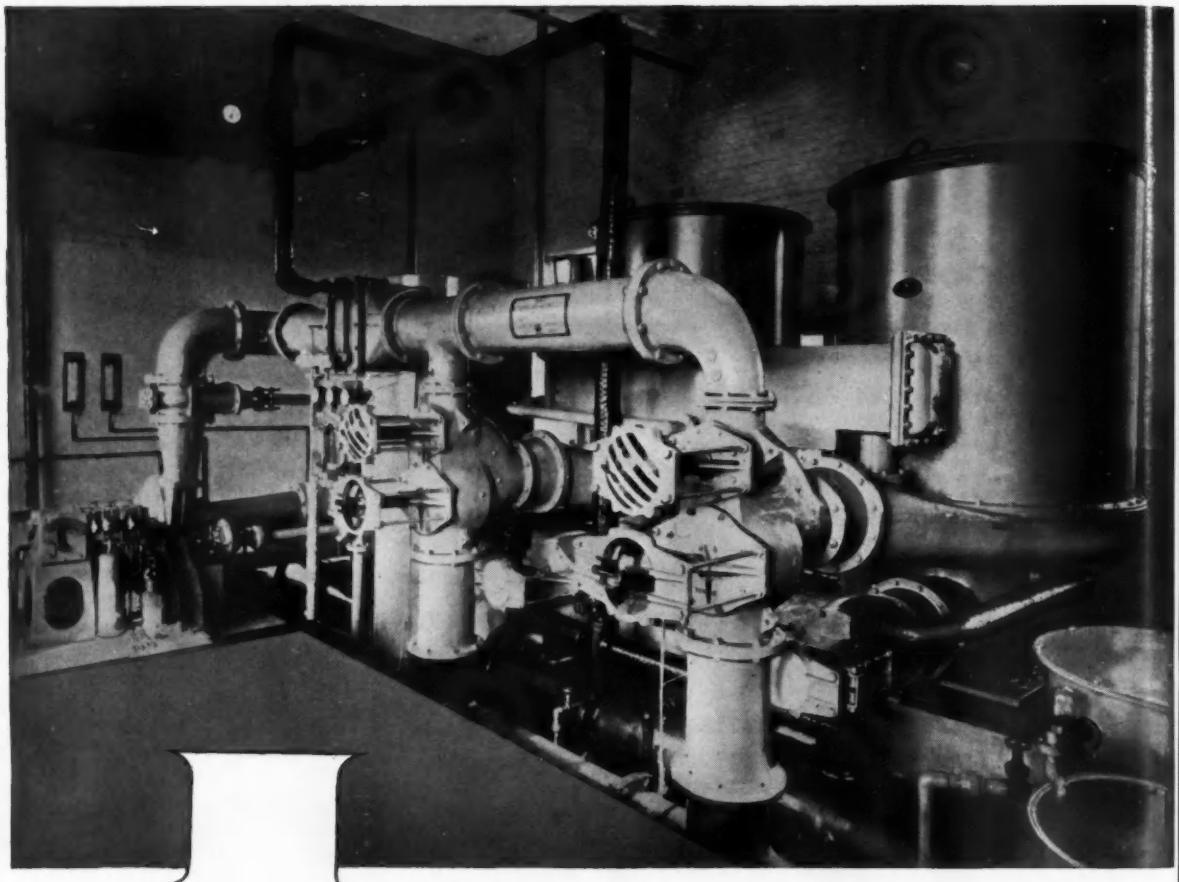

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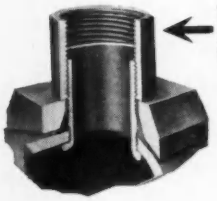

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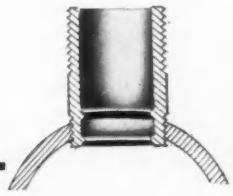

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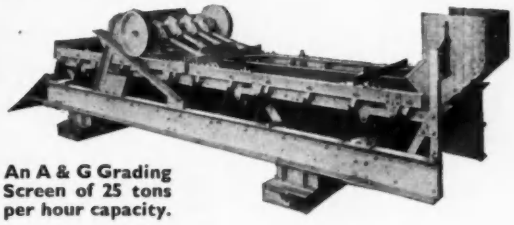

An A & G Grading Screen of 25 tons per hour capacity.

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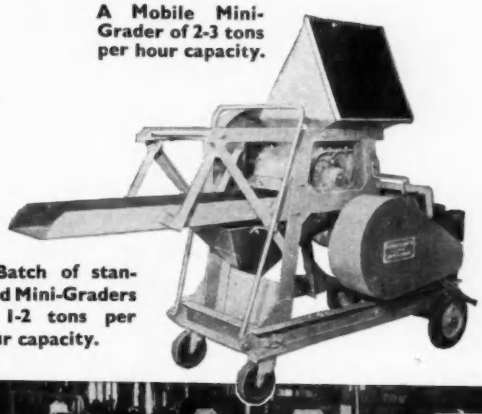
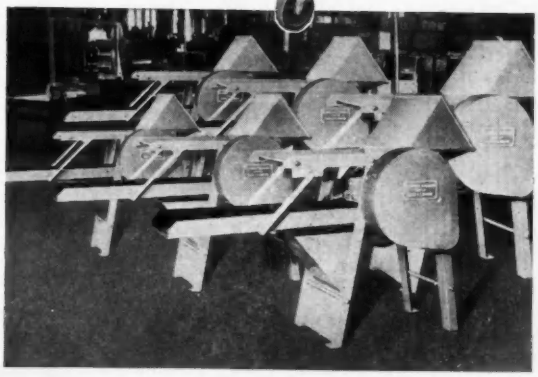


A Batch of standard Mini-Graders of 1-2 tons per hour capacity.



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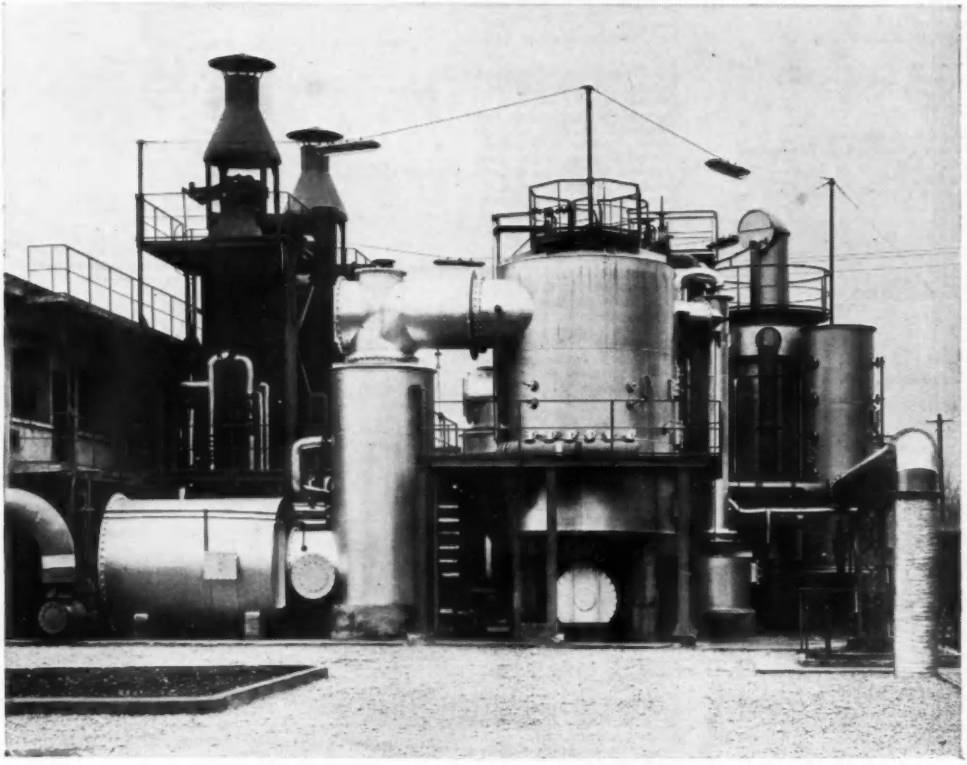

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Gas Journal

VOL. 283 NO. 4806 July 13, 1955

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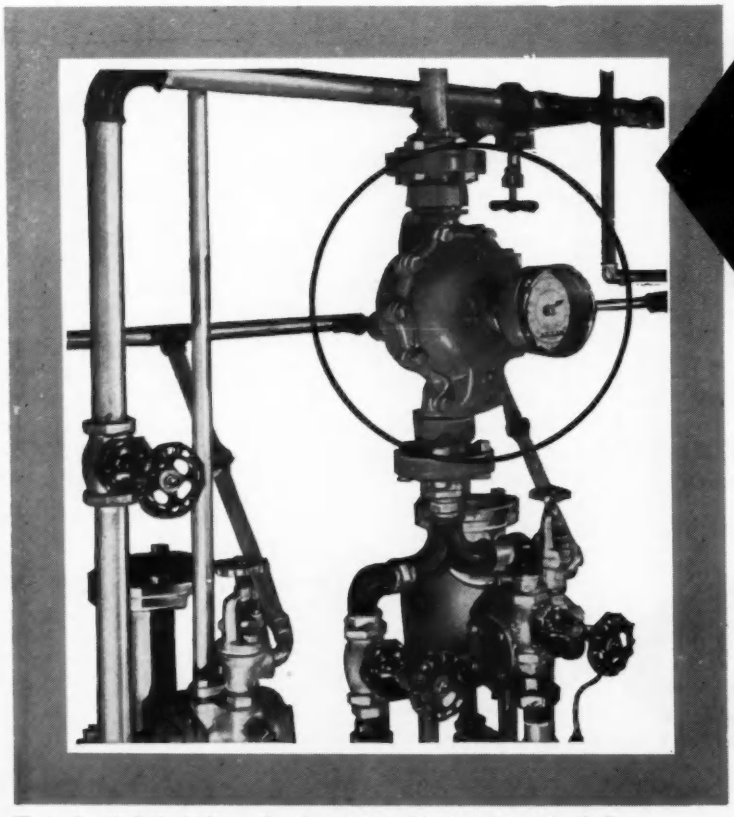

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Gas Journal

VOLUME 283. No. 4806. JULY 13, 1955. 107th YEAR

Record Rise in Coal Price

EVER since the gas industry was nationalised it has had to cope with rising prices for its essential raw material—coal—the cumulative effect up to last Friday having been an average rise of 20s. 8d. ton, or a total of nearly £30 mill. a year. It was common knowledge that a further increase was on the way, but it was hardly expected that in one swoop the National Coal Board would demand an all-round rise of 18%, bringing the gas industry's average increase since nationalisation up to 33s. 8d. a ton, or a total of about £47.75 mill. a year. In view of rising costs the area boards have consistently striven to pass on to gas consumers as small a proportion as possible of those costs and to absorb the major part by way of increased efficiency, but it will clearly be impossible to avoid raising the price of gas and coke—in some cases immediately—to meet this latest addition to their coal bill. In a statement to the Press on Friday, Sir Harold Smith said he was not able to forecast what the increases in the price of gas were likely to be, or when they would be made, as it is the responsibility of each area board to determine its own tariffs and prices, and the increases in the price of coal vary from one area to another. What is certain is that the price of gas and coke will have to bear the increased cost of coal. Faced with the problem of providing more solid smokeless fuel 'at an economic price' in support of the clean air policy the gas industry will find the inevitable rise in the price it will be compelled to charge for coke an even more serious matter than the raising of gas prices.

Only recently, in announcing an increase of 1¾d. per therm in the North Thames area, Mr. Michael Milne-Watson warned the Gas Consultative Council that he might have to come back and ask for more if coal prices showed a substantial increase, and at a meeting in Manchester of the North Western Gas Consultative Council last Thursday, the day before the National Coal Board made its announcement, Mr. D. P. Welman said the price of gas was to be increased by 'about 1¾d.' depending on the extent of the coal rise, which he then anticipated as being between 9s. and 13s. a ton. Explaining the impossibility of avoiding an increase in the price of gas Mr. Welman told the Council that notwithstanding heavy increases in costs over which the Gas Board had no control, gas prices in the area had been pegged at their present level for nearly two and a half years. Improved efficiency, resulting in direct economies of some £700,000 per annum, had enabled the Board in that period to absorb those increased costs and to build up a total credit balance of £1,551,000. Mr. Welman said his Board had always been prepared in forward estimating to anticipate the continued recovery of at least some part of increased costs beyond its control, and such increases have been considerable since the begining of the current financial year. An increase of 3d. a therm for gas in the Northern Gas Board's area was approved by the Northern Gas Consultative Council on Monday. Dearer coal was principally blamed. Mr. E. Crowther, Chairman of the Board, said that it had 'broken even' at the end of the financial year. It was now facing additional annual costs of £1,680,000 a year. Of this, £1,130,000 was due to higher charges for coal and coke-oven gas. The remaining increase was due to extra rail charges, £25,000; wages, superannuation and national insurance, £295,000; and interest and other capital charges, £230,000.

The increase in the inland price of coal, which will come into effect next Monday, is the largest single increase in the long history of the British coal industry. The average is 11s. 5d. a ton, and the increase is expected to yield £53 mill. in 1955 and £118 mill. in a full year. The Coal Board has provided the two Consumers' Councils and other bodies representative of coal consumers with explanations of its financial position and of the considerations that have led to the decision. Sir Ernest Smith, Chairman of the Industrial Coal Consumers' Council, before leaving for a cruise on the day before the details were announced, said that the Council felt there ought to be a thorough enquiry to explain why coal prices were so high. The Council, he said, took a serious view of the increases, though it accepted that the Coal Board had to be a commercial concern and that increases were essential. The outcry against buying foreign coal and losing millions a year was natural, but the Council could not agree to the demand that the increased cost should be made into a subsidy. The Council also felt that the mining industry ought to accept foreign labour. The increases are not such as to secure a reduction in the accumulated deficit (at present £17.4 mill.) by the end of 1956; by the end of 1955 it is expected to rise by £15 mill., and not all of this is likely to be made good in 1956. When these price increases have taken effect the Coal Board proposes to examine, in consultation with organized consumers, the relationship between the prices of the various classes of coal, but without departing from

the general principle that prices will continue to be based primarily on coal quality, nor with the object of increasing the Board's revenue.

The increase of 18% will be applied to the existing prices of all coals supplied for inland consumption. These prices have been fixed primarily by reference to the quality of the individual coals, hence the *increase a ton* payable by the various consumer groups will vary according to the range of quality of the coals taken. The average increases a ton for the main consumer groups are estimated to be as follows: Gasworks, 12s. 5d.; power stations, 9s. 3d.; railways, 12s. 5d.; coking plants—N.C.B., 12s.; coking plants—other, 11s. 8d.; iron and steel, 11s. 6d.; bunkers—coastwise, 12s. 9d.; bunkers—trawlers, 12s. 8d.; all other inland disposals, 10s. 11d.; Northern Ireland (other than house coals), 10s. 9d. The increase of 18% will also be applied to house coals, which are sold in seven quality groups under the Board's zone delivered price scheme. The average increase applicable to all house coals taken together will be about 12s. 8d. a ton.

In addition to the direct effect of a large rise in the cost of its basic raw material the gas industry will share with other industries the indirect results of rises in the cost of electricity, railways, and iron and steel production, on which strong views have been expressed by the Federation of British Industries, the Association of British Chambers of Commerce, the British Iron and Steel Federation, and other bodies. On the other hand the National Industrial Fuel Efficiency Service has accepted the rise as a challenge to greater efficiency, having found that there are few works in general industry where fuel consumption could not be reduced by 15 to 20%.

What Automation Means

THE British Productivity Council has issued as a supplement to its latest *Bulletin* a paper on 'What Automation Means' read by Mr. Frank G. Woollard, M.B.E., at a conference on 'The Automatic Factory organized by the Institution of Production Engineers at Margate. It reached us the morning after the publication of our own Instrumentation Number, when some of our readers as well as ourselves were picturing the automatic gasworks of the future. Automatic operation is not new. Many of our process plants have been subject to automatic operation and control, in whole or in part, for a long time—among them paper-making, printing, flour milling (an automatic flour mill was in operation in 1784), chemical manufacture, petroleum products, and food preparation, and individual automatic metal working machines have been in existence for more than 50 years. What is new is the extension of automatic operation to the hard, heavy, awkward, and unyielding shapes of those components used in industries based on engineering practice, the adoption of controls—electronic or otherwise—and the institution of feed-back apparatus and servo-mechanisms to ensure that accuracy is maintained within predetermined limits. As long ago as 1923 Mr. Woollard built the first automatic transfer machine, and he has throughout his career made a special study of the human and technological aspects of the new system of manufacture.

Listing engines, home appliances, meters of all kinds, and refrigerators among mass production industries which would benefit from automation, the author poses the question, 'Why do we adopt automation, and what do we gain?' and proceeds to give seven answers: Saving of direct labour, greater economy in floor space, lower inventory of work in progress, greater control of processing, cheaper operating heads on the machines, automatic inspection of the work-piece, and fuller utilization of machine capacity. Automation depends on specialization, standardization, and simplification; these are fundamentals without which it cannot function. With the aid of automation Mr. Woollard is of the opinion that we shall enter a new phase of fine living, but we must always remember that automation is not a device with which to outlaw, displace, or dispense with man. It is not a contrivance or an invention to deprive man of his heritage—his right to work and to enjoy the fruits of his labours. It is a means for increasing man's stature and for extending his ability to do more and more useful work, to produce in greater volume with less physical effort or mental strain—a means whereby he can bring to his fellows the fulfilment of their lawful desires and, to their homes, comfort and leisure.

Discussing at the same conference how trade unions would react to automation, Mr. Edwin Fletcher, of the T.U.C. Production Department, said there were few industries in this country in which unions had not experienced, directly or indirectly, some form of automation, and unions knew by experience that that way productivity was increased. He continued: 'Sweeping scientific industrial, and management changes appear to be on the way, the development of one assisting the development of others, with the result that a surge of general development must be anticipated. This is not likely to be retarded by trade union action directed against the developments themselves. Yet the rate of industrial change is likely to be more than has so far been experienced. There will be considerable friction unless trade unions are given full and early information of impending changes, and unless both management and trade unions give serious consideration to the problems of the individuals affected. Since productivity is likely to be increased considerably, there should be sufficient lubrication for injection to those inevitable points of friction which develop into breakdown without early treatment.'

ABSENCE FROM WORK

LOSS of production time and a general lowering of efficiency through absence from work is widely regarded as a serious problem for industry today. Nevertheless, until recently no full-scale attempt has been made to discover the rates of absence which may be considered reasonable and to provide a standard method which may be used for comparison between one company and another. To remedy this situation the British Institute of Management in 1953 undertook an investigation into 'Absence from Work, its Incidence, Cost and Control.' The first step in the investigation was a pilot survey to test methods of recording and analysis. This stage has now been completed and the Institute has lately published in 'Absence from Work—Recording and Analysis' a standard system for compiling evidence on the subject. The method recommended will show information in a form suitable for inter-firm comparison as well as demonstrating the nature

of the problem within the individual concern itself. The booklet contains an invitation for undertakings to participate in a nation-wide survey which will indicate the extent of the problem and provide suggestions for some methods of control. The preliminary investigation has been carried out with the support of leading companies and under the guidance of a committee representing the British Institute of Management, the Institute of Personnel Management, and the Institute of Cost and Works Accountants. 'Absence from Work—Recording and Analysis' is available at 2s. 6d. from the British Institute of Management, Management House, 8, Hill Street, London, W.1.

HIRE-PURCHASE TRENDS

FIGURES published by Hire Purchase Information indicate that the record of hire-purchase sales of all kinds continues to show two divergent trends. The number of hire-purchase contracts in June was 81% higher than a year earlier for new cars, 61% higher for second-hand cars, and 75% higher for motor cycles. But the effects of the restrictions introduced last February have so far been conspicuously uneven, and throughout the country sales of gas appliances have undoubtedly suffered. Although no figures are available regarding hire-purchase sales of heating and other appliances, some firms report that turnover is barely half what it was a year ago, though they point out that strikes and other uncertainties may have deterred buyers as much as the restrictions. In the second issue of *Survey*, the economic and statistical review of the East Midlands Gas Board, Mr. Sydney Smith, Chairman of the Board, says the Orders introduced at the end of February amounted to very much more than the re-introduction of the restrictions lifted some six months before. The deposit required for a cooker is now higher than it has been for many years, and the impact on cooker sales has been very marked.

Orders for most other appliances, for which the new selling terms are not much more onerous than those previously offered, have been well maintained; but despite this after over three months of the new trading conditions, total weekly sales have yet to reach 80% of the figure originally expected during the current year. The East Midlands Board has always accepted the principle that the price of an appliance should be so fixed as to cover, but no more than cover, the cost of purchase from the manufacturer, together with fixing costs and showroom and other marketing expenses. Many of the Board's selling costs are overheads, and the rate of appliance turnover is an important factor in determining whether those overheads will be fully met. Much more serious are the repercussions on the future domestic demand for gas. In the short term the Board does not stand to lose if housewives now decide to retain their old gas cookers a little longer before replacing them, but if they find that an electric cooker may be hired on what are, superficially, much more easy terms, the position is very different. Furthermore, just as a new gas cooker in use is probably the best advertisement for cooking by gas, so the reverse is too often true with models which have long since gone out of date.

OIL ON THE SCREEN

AMONG the many changes in industry which have become apparent during the last 20 to 30 years nothing is more surprising than the way in which films have been utilized to instruct, to inform, and to advertise. Splendid results have been achieved with the most unpromising material, and the industrial documentary has become a new art form. Near the top of the tree in this new medium is the Shell Petroleum Co., Ltd., whose Film Unit has recently come of age with a total of 170 films to its credit—an average of eight a year since its formation. We recently saw two new additions to the Shell library, 'Proud Ships' and 'The Oilmen.' The latter shows on the broadest possible canvas what the Royal Dutch/Shell Group is and does. The film has been made through the eyes of some of the 250,000 men and women all over the world who are in some way concerned with the oil industry. The theme is the many individual skills, professions and technologies that together find oil, refine it, transport it and market it in its many forms and fractions as an essential service to the community. It is also a human story of a contemporary way of life: At work, a complete co-ordination of myriad trades, skills, aptitudes and sciences; at home, the opening up of new outlets for indigenous skills and intelligences, and the creation, where often before was jungle or desert, of modern townships or communities where the well-being of the oilman and his family is paramount and their individuality given free play. 'At home' might be anywhere, for there is scarcely a country in the world where Shell does not have a part in the life of the country and its development. From a technical point of view the film is beautifully made. It includes natural dialogue, a first-class musical score, and a mastery of the medium which is rarely apparent in films of this nature. Less impressive was 'Proud Ships' dealing, as the title suggests, with the service rendered by oil tankers which, by the way, constitute nearly a quarter of all merchant shipping afloat. About one-fifth of this is contributed by tankers in service with or on long-term charter of the Royal Dutch/Shell Group of companies. The film takes as an example the Shell tanker 'Liparus,' and attempts to tell its story of life in the fleet in human terms and in its real setting. 'Liparus,' her officers and crew, are first seen on a normal run from Curacao in the West Indies to a port on the East Coast of the United States. That she is a part of a greater scheme for the world-wide transportation of oil and its products becomes clear when an emergency on the other side of the globe makes the operations department in London divert her while still at sea to another destination, this time, as the pleasure of the ship's company attest, in home waters.

The film is interesting in that it reveals the possibilities of filming the gas industry's colliery fleet in a somewhat similar manner. It seems curious that this promising aspect of the gas industry's life has not received feature treatment in the past. The fundamental material is there for the picking, but the ultimate success of the film would depend entirely on the skill of its creators. We commend the idea to the Gas Council, itself a major name in industrial film-making circles.

EXPERIMENTAL CHEMISTRY

In 'Experimental Chemistry—Part I' (Sir Isaac Pitman & Sons, Ltd., 9s.), J. E. Garside and P. A. Claret, the authors, have attempted to present a working scheme of qualitative and volumetric analysis which they have used for a number of years at the Northampton Polytechnic, London. This scheme of qualitative and volumetric analysis, says a preface, is suitable for those planning to take chemistry at Advanced or Scholarship levels of the General Certificate of Education, for those taking Ordinary National Certificate in either Chemistry or Applied Chemistry and for students taking chemistry as an ancillary subject in such courses as metallurgy, fuel technology, chemical engineering, metal finishing, ophthalmic optics, pharmacy and medicine.

In connection with the section dealing with qualitative analysis particular attention is drawn to the advantages which accrue from the employment of the semi-micro analytical technique; in particular, the greater working speed attainable, the economies effected in chemicals and materials and the improved quality of students' work engendered by the practice of a more elegant technique.

Personal Notes

SIR HAROLD (ERNEST GEORGES) WEST, whose impending retirement from the Managing Directorship of Newton, Chambers & Co., Ltd., was announced as we went to press last week, has worked for the Company for 36 years and for 23 of them he was building up the chemicals department to its present world-wide importance. Born in Essex and trained as an engineer, he was commissioned and severely wounded in the first world war, and was Senior Technical Assistant to the Surveyor General of Supply, War Office, from 1917 to 1919. He joined Newton, Chambers, & Co., Ltd., in 1919, and has been Managing Director since 1941 and Vice-Chairman since 1953. He was knighted for industrial and educational services in June, 1948. Sir Harold is Chairman of the Governors of Loughborough College of Technology, Member of the Council of the Boy Scouts' Association and County Commissioner for South Yorkshire, Chairman of the Sheffield Academic Board for Advanced Technology, and of many other organizations.

Left: Sir Harold West.

Right: Mr. P. J. C. Bovill.

He has travelled extensively in Europe, India, the Far East, Africa, America, and Canada, and is Past President of several national institutions, societies, and trade associations. He has initiated and carried through nationally-known experiments in industrial training and management training, and he organized the 'Management Through Leadership' lectures at Sheffield in 1948. He was Master Cutler of Sheffield in 1952-53, and President of the Sheffield Chamber of Commerce in 1948-49. Sir Harold was Vice-Chairman and Chairman of the Institute of Industrial Administration, 1948 to 1951. He is Chairman (Yorkshire Regional Committee) of Ministry of Labour and National Service for the training of men and women returning from the forces in business administration; Fellow of Royal Society of Arts, and Silver Medallist for 'The Thorncliffe Experiment in Employee Relationships,' 1950.

MR. P. J. C. BOVILL, who is to succeed Sir Harold West as Managing Director, has spent the greater part of his professional career with Newton, Chambers and its subsidiaries, and in January, 1954, was appointed Assistant Managing Director with special responsibility for the Chemicals Division. Educated at Cheltenham College, he graduated in fuel technology at Sheffield University and joined the Company in 1922 as Assistant Manager of Thorncliffe Coal Distillation, Ltd., then newly-formed. Two years later he was appointed Assistant Manager of the Chemicals Department and in 1928 became Works and Sales Manager of the tar distillation works. In 1933 he was appointed Joint Manager of Coke Oven Products, Ltd. (in which Newton Chambers was a partner) and from there went in 1939 to the Rother Vale Collieries branch of the United Steel Companies as Commercial Manager of the chemicals department.

He returned to Thorncliffe in February, 1942, as a Local Director and General Manager of the Chemicals Branch, which has steadily developed and progressed under his direction. Mr. Bovill was appointed Vice-Chairman of the Board of Local Directors in November, 1951. He is a member of the Joint Industrial Council governing wages and conditions in the chemicals industry and a member of the Executive Board of the Association of Chemical and Allied Employers.

Mr. Bovill is Chairman of Sheffield No. 1 Hospital Management Committee and was awarded the Queen's Coronation Medal in recognition of this important voluntary public service. About a year ago he accepted an invitation to join the Board of Governors of Sheffield Trustee Savings Bank. For many years he has done outstanding work for the Boy Scout movement as Hon. Secretary of the Wentworth Local Association and later as Chairman. Mr. Bovill was commissioned in the first world war, when he served in Mesopotamia and India, and in the last war he commanded a company of the Home Guard.

MR. S. SMITH (Penrith) is the President and Chairman of the Cumberland and Westmorland Gas Managers' Association for 1955-56, but is unfortunately absent owing to illness, and MR. A. R. CROFT (Carlisle) is the Vice-President for 1955-56. Mr. Croft is, therefore, assuming the duties, during Mr. Smith's absence, of Chairman to the Association. The names were inadvertently confused in our 'Personal' column last week.

MR. W. D. KING, Deputy Chairman of Radiation Ltd., has relinquished his special duties as Technical Director. MR. A. R. BENNETT, of Radiation Central Research Laboratories, has been appointed General Manager, Research and Development, for the Radiation Group.

MR. W. K. TATE, General Manager, Eastern Division, Southern Gas Board, on leaving to join Thomas Glover and Co., Ltd., as Managing Director, and the Board of the parent Company, Glover and Main, Ltd., was on June 29 presented with a farewell gift of a grandmother clock. Mr. R. W. Hewitt, Divisional Accountant, Mr. H. M. Lawrence and Mr. G. Neil, General Managers of the Portsmouth and Southampton Undertakings, paid tribute to Mr. Tate, and an apology was made for the unavoidable absence of Mr. G. G. Warne, General Manager in the Isle of Wight. In making the presentation on behalf of all the employees in the Eastern Division, Mr. Hewitt wished Mr. Tate every success and happiness in his new sphere. Mr. Tate, in reply, referred to his 10 years in Portsmouth, first with the Portsmouth and Gosport Gas Company, where he had followed the late Mr. Thomas Carmichael, and since nationalisation as Divisional General Manager. The clock would remind him and his family of their many friends in that part of the Southern Gas Board and he hoped that occasions like sports days would give them the opportunity, in the future, of renewing these acquaintances.

Diary

July 14. — SOUTH EASTERN G.C.C.: Special Meeting to be addressed by R. S. Johnson, Deputy Chairman, South Eastern Gas Board, Caxton Hall, Westminster, 3 p.m.

July 19.—SOUTH WESTERN GAS BOARD: Laying of last pipe of 1,000th mile of main laid in the South West since vesting day, by Sir Harold Smith, Chairman, Gas Council, Old Foss Way, Beacon Hill, Shepton Mallet, Somerset, 12 noon.

July 21.—London and Counties Coke Sales Circle: All-day visit to Swindon, where members will see Swindon gasworks in the morning and tour the workshops of British Railways in the afternoon.

July 22.—BRITISH GAS STAFF ASSOCIATION: Opening of new headquarters, 34, Gloucester Gardens, Bishops Bridge Road, W.2, by the Mayor of Paddington, 3 p.m.

July 25.—EASTERN G.C.C.: Criterion Restaurant, Piccadilly Circus, W.1, 2 p.m.

July 28.—NORTH THAMES G.C.C.: Westminster City Hall, Charing Cross Road, W.C.2, 2.30 p.m.

Inauguration of New Extensions at SMETHWICK

The formal opening of the extensions at Smethwick was reported in our last issue. We now give a description of the new plant.

General view of the retort house and coke screening plant.

THE inauguration on June 30 was a fitting culmination to 40 years of valuable service to the gas industry by Mr. E. Hardiker, who, when the Smethwick Gas Committee in 1948 initiated plans to increase the plant from 4½ mill. cu.ft. to 7½ mill. cu.ft. per day, was Engineer and Manager of the undertaking and was responsible for the preparation of the plans, which were authorized by the Ministry of Fuel and Power. When the gas industry was nationalised in May, 1949, the project, together with the general layout and design, was formally approved by the West Midlands Gas Board. The responsibility for the actual reconstruction devolved on Mr. Hardiker in his capacity as Divisional General Manager of the Walsall and District Division. The congested nature of the site proved a serious problem in the design of the plant, but by careful scheming the difficulty has been surmounted, and the reconstruction has made the works one of the most modern in the country.

The new carbonizing plant comprises two benches each containing 16 Woodall-Duckham lambent heated continuous vertical retorts capable of carbonizing 274 tons of coal per day and of producing 4,624,000 cu. ft. of 450 B.Th.U. gas. The retorts are heated by hot producer gas generated in two Humphreys & Glasgow mechanical gas producers with a third producer acting as standby. The installation is provided with complete coal and coke handling, coke screening and storage plants, an ash handling and storage plant, two waste heat boilers, dust extraction and vacuum cleaning plants, and with ancillary plant comprising condensers, exhausters, hot and cold gas electro-detarrers, a solid fuel boiler plant and a water softening plant. The retort house has been architecturally designed to present an attractive appearance; all other new buildings harmonize with it.

The retorts are approximately 26 ft. high, rectangular in plan and tapered to allow continuous regular descent of the coal. They are 10 in. wide at the top and 82 in. long and arranged so that any one retort can be controlled without affecting the others. The benches of 16 retorts are provided with transverse air-cooled division walls dividing each bench into four sections of four retorts, to facilitate cold repairs to any section without interfering with the working of the others.

The residual heat in the coke is utilized for the production of water gas within the retort by admitting low pressure steam through calibrated nozzles fitted into the curved plate of the extractor box. The coke is finally quenched by specially designed water sprays within the extractor box and is discharged dry and cool. A Drummond dust extraction plant is provided to ensure that there is no dust or smoke nuisance arising from the coke discharging operation.

Coal Handling

Coal is brought into the works on an elevated rail gantry, which has been extended to serve the new plant. The gantry extension, which is of reinforced concrete construction and over 400 ft. long, is provided with an electrically-operated Strachan and Henshaw wagon tippler of the side discharge type capable of handling the new 24½ tons coal wagons. The coal is discharged into a reinforced concrete receiving hopper of 50 tons capacity built to the side of, but integral with, the gantry. A reinforced concrete housing built above the receiving hopper encloses the wagon during tipping and is coupled to the dust extraction plant. Provision has been made on the gantry for a second tippler at a later date. From the hopper the coal is fed, by means of a Locker-Traylor electric vibrating feeder, to a four roll coal breaker which reduces it to a maximum of about 3½ in. cube. A small reclaiming hopper is provided beside the main receiving hopper to receive coal reclaimed from open storage by Chaseside shovels. The feeder has a screening section to enable small coal to by-pass the breaker. The coal from the breaker or the by-pass chute is delivered on to a 24 in. band conveyor which, in turn, feeds it, via rotary fillers, on to the lower strand of either of two gravity bucket conveyors encircling the end bay of the retort house. The encircling conveyors elevate the coal and deliver it on to a 24 in. band conveyor from which it is fed, via a 24 in. reversible shuttle band conveyor, into the overhead coal storage hoppers arranged above the retort bench. From the storage hoppers which have an untrimmed capacity of 48 hours coal requirements, the coal is fed through rotary valves into the auxiliary supply hoppers attached to the top mouthpieces of the retorts. The gravity bucket conveyors are automatically

The coal bunker stage, shuttle belt, and terminations of the ventilating ducts from the top of the setting level.

lubricated while in use by pairs of oil guns operated by the movement of the chain. The coal handling plant is capable of dealing with 70 tons of coal per hour.

Gas Collecting System

The gas leaves the top of the retort through an off-take pipe, where it is sprayed with hot ammoniacal liquor, and then passes through a liquor sealed dish off-take valve into the collecting main. The valve enables the individual retort to be closed off from the collecting main when desired. There are four collecting mains, one along each side of each bench and each main has a fall towards its centre where the tar and liquor collect and are run off to the tar and liquor separating tanks. The gas passes from the collecting mains, through uptakes where it is again sprayed, to the foul mains above. The four foul mains are extended to the centre bay between the benches where they are coupled together into a suction main leading to the condensers. The hot liquor from the sprays flows back through the collecting mains to the two tar and liquor separating tanks where the tar is deposited and run off at intervals. Normally one tank serves one bench, but they are interconnected so that either tank can serve both benches during cleaning operations. The decanted liquor from the tanks is pumped back to the sprays in the offtakes, collecting and foul mains by direct-acting steam-driven Weir pumps of which there are three, one serving each bench with the third acting as a common standby. An 8,000 gal. clean liquor storage tank provides make-up liquor as required.

Mechanical Producers

To supply the gas for heating the retorts, three 8 ft. diameter Humphreys & Glasgow mechanical producers are provided, any one of which is capable of providing sufficient producer gas to heat either of the benches of 16 retorts. The third producer forms a standby. Mechanical producers were chosen as they eliminate the arduous manual labour of fire cleaning, give ease of control of quantity and quality of producer gas and, most important of all, are capable of gasifying the smaller graded sizes of coke.

The producers are each provided with an automatic charger which feeds and distributes the coke over the fuel bed. The grate, together with the ash pan, is rotated at a rate which is varied to suit the coke throughput of the producer, and the ash content of the fuel used. The ash and clinker are extracted through the water seal and discharged, quenched and dustless, at a fixed point into ash skips. The grate is driven electrically through a worm meshing with a worm wheel enveloping the grate base.

Each producer is provided with an annular boiler generating sufficient steam at 20 lb. per sq. in. to saturate the air blast to the producer. The air blast is provided by two blowers, one driven by a steam turbine and the other by an electric motor, each being large enough to supply the air required by two producers under full load.

The producer gas leaving the generator passes through dust separators, which remove all but the finest dust particles and then goes forward to the retort settings at a temperature in the region of 500°C.

The waste gases from the heating flues of the retorts pass to the waste gas mains wherein they are conveyed to the waste heat boilers, one for each bench, and they are of the Woodall-Duckham horizontal fire-tube, induced-draught type. They are designed for a working pressure of 200 lb. per sq. in. and their output is rated at 12,800 lb. per hour of saturated steam. Provision has been made for the future installation of superheaters. Each boiler is provided with an induced draught fan driven by a direct coupled steam turbine, or by an alternative electric motor. Two vertical, single cylinder, direct-acting feed-water pumps are provided, each capable of supplying the needs of both boilers with one pump acting as a standby.

Coke Handling and Storage Plant

The contents of the coke chambers beneath the retorts are discharged through a travelling chute running on rails laid in the retort house floor on to either of two parallel 30 in. band conveyors running in a trench beneath the floor level. One conveyor only is in operation with the other acting as a standby. Each conveyor delivers the coke, via a rotary filler, into either of the encircling gravity bucket conveyors. Normally one gravity bucket conveyor handles coal, while the other handles coke, thus enabling coaling and coking of the plant to be undertaken simultaneously, but, in the event of either being out of commission, the design of the chutes permits the handling of either coal or coke on the remaining conveyor.

The run-of-retort coke elevated by the gravity bucket conveyors can be delivered to the retort scurfing coke hopper within the house, or to the screening and storage plant in the yard, or to the screening and storage plant above the elevated rail gantry.

Coke for the retorts after scurfing is delivered from the gravity bucket conveyors by means of dumpers on to the 24 in. band conveyor feeding the 24 in. shuttle band conveyor into the retort coke scurfing hopper arranged between the overhead coal storage hoppers. From this hopper the coke is fed into a hand-propelled retort filling skip running on an overhead track. This skip can be discharged directly into any of the retorts.

Run-of-retort coke for the coke screening and storage plant

in the yard is discharged from the top strand of either G.B. conveyor on to a 30 in. band conveyor which, in turn, delivers on to another 30 in. band conveyor which feeds either of the two duplicate parallel screening and cutting units. The units comprise duplicate Gyrex vibrating scalping screens which remove all coke of size 1¼ in. and over. This large coke passes either into duplicate P.S.C. coke cutters, or down a spiral chute, direct into the large coke compartment of the storage bunkers below. The undersize coke from the screens and the cut coke from the cutters are delivered to duplicate Gyrex vibrating debreezing screens for the removal of breeze and then to duplicate Cort's balanced reciprocating grading screens. These screens grade the coke into three sizes, 1¼ in. to 1½ in., 1½ in. to 1 in. and 1 in. to $\frac{7}{16}$ in., and deliver directly into their respective compartments in the storage bunkers. The screens are each capable of dealing with 35 tons of coke per hour. The breeze separated by the debreezing screens is passed to a separate compartment of the bunkers. The storage bunkers have a total capacity of 600 tons of coke and breeze and are of reinforced concrete, brick and steel construction and are architecturally designed to match the retort house. Four A.C.E. travelling debreezing screens are provided to remove the breeze from coke delivered to road vehicles or bags, and there are two portable Belle Isle weighing and bagging machines on the bagging platform.

Run-of-retort coke for the rail screening and storage plant is discharged from the top strand of either G.B. conveyor in the retort house on to two 30 in. band conveyors, thence to a double deck 'Gyrex' screen. This screen grades the coke into three sizes, over 1¼ in., 1¼ in. to ¾ in., and ¾ in. to 0, which are delivered directly into their respective compartments in the bunkers beneath. The bunkers and screen house are of reinforced concrete, and the total storage capacity is 100 tons of coke and breeze. In addition to the chutes which allow all sizes of coke and breeze to be loaded into the rail wagons beneath, there are chutes for loading breeze to road vehicles at the side. The coke handling plant as a whole is capable of dealing with 35 tons of coke per hour.

Four continuous weighers and recorders by Adequate Weighers are provided to weigh all coal delivered to the overhead coal storage bunkers, run-of-retort coke delivered to either the yard or the rail bunkers and graded coke returned to the producer fuel hoppers.

Ash Handling and Storage

Ash from the mechanical producers and the solid fuel boiler plant and sludge from the dust extraction plant are handled by skips on stillages which are transported by Lister auto-trucks to the overhead ash storage hopper in the yard where the skips are lifted and discharged into the hopper by an electrically-operated skip hoist. The hopper is of reinforced concrete and has a capacity of 70 tons of ash and clinker. The hopper is blue tile lined and discharges into road vehicles beneath.

To prevent any dust nuisance within the retort house during the coke discharging operation, or in the yard at the coke loading points beneath the bunkers, a Drummond dust extraction plant has been provided. Ducting from the hoods at the coke dischargers and from the debreezing screens is connected to washer filter units located outside the retort house. A separate dust extraction plant with its own washer filter unit is provided for the wagon tippler house. To assist the maintenance of cleanliness within the retort house and within the screen house above the yard bunkers, a Sturtevant vacuum cleaning plant has been provided with hose coupling points distributed throughout both buildings.

Retort House and Buildings

Care has been taken by the architect in the design of the retort house to present a building which is both attractive and functional. It is a steel-framed brick-panelled and embellished structure with the chimneys enclosed in towers built integral with the house. All external steelwork is enclosed and sand-faced bricks have been used throughout. The exhauster house, solid fuel boiler house and meter house are of similar design and faced with the same brick.

Within the retort house and at floor level separate buildings enclose the extractor drives, the waste heat boiler feed and booster pumps, the liquor pumps, the producer blower and producer boiler feed pumps, and the lift motor house. At the top of setting level an instrument room has been provided to accommodate the main instrument panel which is by Electroflo Meters Co., Ltd. The foundations for the plant are carried on reinforced concrete piles.

Hot Gas Detarrers

Four 7 ft. 6 in. Whessoe W-D detarrers are provided to remove the condensates. Two deal with the gas from the new carbonizing plant and the others with that from the existing plants. The two serving the new plant are capable of dealing with the total gas output of the 32 retorts with an efficiency of 99.5% ± 0.5%. In an emergency one can deal with the full load at a decreased efficiency.

From the hot gas detarrers the gas passes through three condensers of the Atlas horizontal water tube type manufactured by Horseley Bridge and Thomas Piggott, Ltd. Each condenser is capable of cooling 1.5 mill. cu.ft. of gas per day from 170°F. to 60°F. when using water at 55°F. The cooled gas from the condensers, together with cooled gas from the existing plant, flows to the exhausters.

The producer side of the retort bench.

On the coal gas plant there are two Holmes-Connersville exhausters each of 8 mill. cu.ft. per day capacity. These are driven by Bellis & Morcom compound vertical steam engines with Askania by-pass control.

Cold Gas Detarrers

A new 6 ft. 6 in. diameter Whessoe W-D detarrer has been provided to work in conjunction with the repositioned existing detarrer at the outlet of the exhauster to eliminate any tar fog arising from condensing. The new detarrer is capable of treating 6 mill. cu.ft. of gas per day with an extraction efficiency of 99.5% ±0.5%. Normally one detarrer acts as a standby to the other but, for heavy loads, they can be worked together.

The multi-stage ammonia washers by W. C. Holmes & Co., Ltd., are arranged as three units in series, each unit with four washing stages, and were made up by re-arranging the existing washers and adding a third unit. The capacity of the finished set is 8 mill. cu.ft. per day for ammonia washing, and this load can be held satisfactorily with any two units only, if the third should be off for attention.

The spacious and well-lighted top of setting level.

Dry Purification Plant

The dry purification plant consists of a set of towers installed by W. C. Holmes & Co., Ltd., with a working capacity of 7 mill. cu.ft. per day. The installation consists of six working towers, each 18 ft. 7 in. diameter by 52 ft. 10½ in. high; one stocking tower and one stocking frame each of similar dimensions to the working towers. Each working tower has 12 double layer containers, each layer holding a depth of approximately 17 in. of oxide. A spare set of 12 containers are supplied and are stored ready filled with fresh oxide in the stocking frame; this facilitates the speedy change over of any tower.

To minimize water condensation from the gas on the underside of the tower covers, these have been slightly domed and insulated on the interior with 2 in. thick slab cork. This has been finally treated with a waterproof protective coating which is also resistant to naphthas.

Gas connections are provided for backward working rotation of the towers. Each tower is fitted with three 30 in. Holmes-Western double faced valves and in addition, each tower inlet and outlet is fitted with a 30 in. water seal 'U' type valve for complete isolation of any tower open to atmosphere.

Each working tower is fitted with a gas heater which is capable of raising the temperature of gas through 20°F., from approximately atmospheric temperature when supplied with steam at 15 lb. per sq. in. gauge. Open steam can be introduced at each tower inlet to assist in controlling the moisture in the oxide. Revivification air can be introduced to any tower by means of two 6 in. by 15 in. Connersville blowers, each driven by two-speed motor with two-speed V-rope drive handling 17,700 cu.ft. per hour against a pressure of 60 w.g.

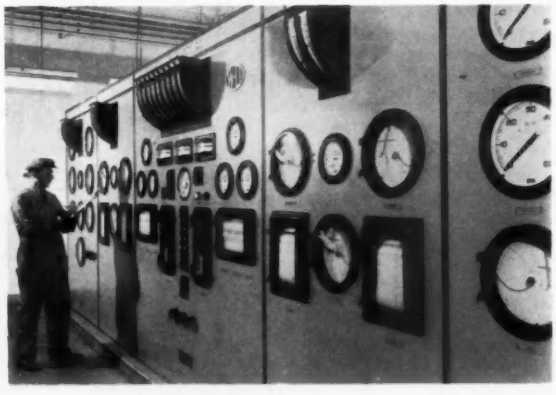
The oxide crusher, which is V-rope driven, is made by British Jeffrey-Diamond, Ltd., and is an 18 in. by 18 in. two-single roller breaker, and is capable of reducing 15 tons per hour of spent oxide from a feed size 0/9 in. cube to a product below 4 in. screen. The roll crusher delivers to a 30 in. Crone and Taylor disintegrator which in turn delivers on to a rubber belt conveyor delivering the disintegrated oxide to a heap where it can easily be handled. Containers are refilled with fresh oxide while rotating on a turntable; this ensures even laying of the oxide mass.

The purifier set is served by a Goliath crane which has a main lift of 35 tons at a speed of 20 ft. per minute, an automatically engaging and disengaging frame being fitted to facilitate the handling of the oxide containers. Access to the top working platform is provided by a passenger lift capable of carrying 20 cwt. at approximately 90 to 100 ft. per minute. A motor-driven gas-fired inert gas purging machine is provided as an integral part of the installation with a capacity of 15,000 cu.ft. per hour. Purge gas connections are permanent to all washing towers and the stocking tower.

Solid Fuel Boiler Plant

Two Paxman horizontal economic boilers are provided to raise steam for works purposes. The boilers are designed for firing with a mixture of coke breeze and slack, and are fitted with shovel type mechanical stokers, electric-motor driven induced draught fans and soot blowers. The boilers are designed for a working pressure of 200 lb. per sq. in. and each is capable of generating 6,800 lb. of steam per hour. There are two direct-acting feed water pumps, one acting as standby. Fuel for the boilers is brought in skips and discharged into a feed hopper of two tons capacity. This hopper has two compartments which enable either coke or coal to be fed separately if desired. From the hopper a Locker-Traylor vibrating feeder delivers the fuel into the bottom of a continuous bucket elevator which elevates and discharges it into two storage bunkers arranged above the boilers. Each bunker has a storage capacity of 30 tons of fuel, and the feeder and elevator are capable of handling 10 tons per hour.

Water for the waste heat boilers, mechanical producer annular boilers, solid fuel boilers and the existing water gas plant is obtained from the two works wells or from the town mains and is treated in a Neckar water softening plant of the hot process lime, soda-ash, sodium-aluminate type. The water is first dosed with a Calgon solution and then passed through the water-cooled condensers to the softening plant which operates at a temperature of 130°F. to 140°F. The plant is capable of dealing with 4,500 gal. per hour. After treatment the water for the boilers is passed to the sodium sulphite conditioning equipment where the oxygen content of the feed water is reduced.



The retort house instrument panel.

There are three Holmes Connersville positive displacement type station meters. There is a 2.4 mill. cu.ft. per day meter on the carburetted water gas plant and two 7.8 mill. cu.ft. per day meters on the coal gas plant

Smethwick Works in Retrospect

William Murdoch, the originator of gas lighting, removed from Redruth, Cornwall, to Boulton and Watt's Soho Foundry at Smethwick in 1798. These works are still in existence and form part of the premises of W. & T. Avery, Ltd. Murdoch further developed his experiments in the gas process, and by constructing apparatus on a larger scale, eventually illuminated the principal shops at the foundry, reputed to be the first gas lighting installation in the country. It was here, too, that Murdoch developed the direct-fired 'D' shaped horizontal

retorts, in settings of three, and other plant almost identical with that still in use at the present time. Between 1800 and 1808 he erected what was one of the first cylindrical gasholders, which exists to this day.

Smethwick originally formed part of the area supplied by the Birmingham and Staffordshire Gas Light Company, but in 1875 the powers of the Company were purchased by the Corporation of Birmingham. A clause had been inserted in the Bill which enabled the outlying districts to erect works for themselves. After lengthy proceedings Smethwick, West Bromwich, Oldbury, and Tipton availed themselves of this privilege. The purchase price of the undertaking amounted to £6,090, and the Smethwick works, erected at a cost of £49,000, was opened on October 1, 1881.

Work was commenced on the present site in 1877, and by 1881 the undertaking had so developed that it was necessary to prepare plans and specifications for additional plant, and sanction was obtained to borrow £75,000. In 1892 the sales of gas had increased to an extent that it became imperative to make provision for greater productive power, and the old direct-fired retorts were replaced by Klonne's regenerative furnaces and a station meter, condensers and washers were installed, bringing the capacity of the works to 1½ mill. cu.ft. per day.

The rapid growth of the town, coupled with the improvement of trade and the introduction of the prepayment meter system in 1898, again rendered extensions of plant necessary and the retort house was further enlarged and four beds of inclined retorts were included. At that time the first exhibitions and demonstrations of gas cookers and heating apparatus were held in the town.

Owing to the absence of railway communication into the works before 1900, all the coal carbonized had to be carted from the stations at no small expense and inconvenience, especially in winter. After negotiations with the railway and canal companies a steel bridge was erected over the Birmingham and Wolverhampton Canal, and railway sidings into the works connecting the former London, Midland and Scottish Railway system.

To meet the growing demand for gas a new carburetted water gas plant was installed. Supplied by the Economical Gas Apparatus Construction Co., Ltd., it was duplicated shortly afterwards, the combined water gas capacity being 1 mill. cu.ft. per day. By now the purifiers had become unequal to the amount of work demanded of them and additional sets were introduced. By 1910, the consumption of gas had again outgrown the capacity of the works, and after careful investigation into the relative merits of coke ovens, horizontal and vertical carbonizing systems, it was decided, after taking into account the restricted site, to replace the existing retorts by Duckham and Cloudesley vertical retorts. The installation was duplicated in 1913, and the exhausters, condensers and washers increased in conformity with the larger productive capacity.

At the close of the first world war, with the rapid expansion of industry and the consequent consumption of gas, it became necessary to increase further the capacity of the works. Land was purchased for the erection of a gasholder, and the vertical retorts reconstructed, their capacity being raised from 2¾ to 3½ mill. cu.ft. per day. The carburetted water gas plant was also remodelled and its capacity raised from 1 mill. to 1¼ mill. cu.ft. per day. The purifying capacity was not adequate for the higher production and a set of overhead purifiers with oxide handling gear was added to the existing plant. A mono-rail telpher was brought into use, replacing an old coke conveyor, for the withdrawal of coke from the vertical retort house to screens and for yard stacking.

By 1938, a vigorous sales policy, both in the industrial and domestic fields, had led to the gas consumed per consumer becoming the highest in the country. A separate fittings department, a meter repair shop, and industrial showrooms were completed in 1930, while a service centre was opened a year later. In 1935, half the carbonizing plant was reconstructed and by the use of end producers the capacity of the plant on the same site was increased from 3¾ to 4½ mill. cu.ft. Water tube condensers, exhausters and a coke screening plant were also included to deal with the additional production. By 1938 another section of the carbonising plant had been altered and by using external producers the capacity raised to 4½ mill. cu.ft. per day. During the war years the industries of Smethwick turned entirely to production for national requirements and the demand for gas far exceeded the production of the works; gas was therefore purchased from the Birmingham Gas Department to meet prevailing needs, while reconstruction to deal with the load was planned.

Since the installation of a carburetted water gas plant could be more speedily effected than one for carbonizing, designs were prepared in 1945 for the erection of an automatically-operated C.W.G. plant housed in the old building, which had to be extended, and was complete with blowers, exhausters, etc., condenser and electrostatic detarrer. This was put to work in 1948 and immediately arrangements were made for installing

The reconstruction has made Smethwick gasworks one of the most modern in the country.

a second plant in the same house, with waste heat boiler, each of which had a nominal capacity of 1 mill. cu.ft. per day.

The old retort house, originally built for horizontal and inclined retorts, could not be adapted for modern vertical installation, and it was, therefore, decided to build a new retort house in the middle of the works. As it was impossible to purchase any more land to extend the existing works, the extra purifying capacity was met by the construction at the side of the spiral-guided gasholder of a set of tower purifiers capable of dealing with 7 mill. cu.ft. per day.

The scheme involved the demolition of the fitting and machine shop and in planning another, facilities were provided for the employees by building a canteen and kitchen, and also necessary office accommodation. This building contains, on the ground floor, the machine shop and workshop with welding bay, and a garage equipped with a 5-ton Tecalemit truck lift, and high pressure lubricating and washing facilities. It is here that the fleet of cars required by the Smethwick Group are serviced and repaired. The first floor consists of offices and well-equipped kitchen serving both works and staff canteen; the second floor consists of offices, half of which are occupied by the Divisional Engineer and his staff. By 1948, demands for gas, especially for industrial purposes, were again in excess of the manufacturing capacity of the plant, and the need for an extension of the works had become one of urgency.

The Contractors

The contractors for the new extensions inaugurated on June 30 were as follows:

Woodall-Duckham Construction Co. Ltd.	Retort house, boiler house, exhauster house, condensers, detarrers, washer, gantry, water treatment plant, demolition of old plant.
W. C. Holmes & Co., Ltd.	Tower purifiers, with handling plant and oxide storage shed; three station meters.
Humphreys & Glasgow, Ltd.	Two water gas machines with condenser and electrostatic detarrer.
C. Green & Sons, Ltd.	Workshop, canteen, and office block.
E. E. Jeavons & Co., Ltd.	Yard paving.
Robert M. Douglas (Contractors), Ltd.	Gasholder foundations.
Horseley Bridge & Thos. Piggott, Ltd. ..	Spiral-guided gasholder (2 mill. cu. ft.).
Whittaker Ellis, Ltd.	Mainlaying.
Chemical Engineering Wiltons, Ltd. ..	Concentrated ammonia plant.
A. F. R. Godfrey & Co., Ltd.	Ablution and medical block.

NATIONALISED INDUSTRY'S DUTY TO CONSUMERS

SIR HUBERT HOULDSWORTH, Q.C., Chairman of the National Coal Board, addressing the annual conference of the National Union of Mineworkers at Rothesay on July 5, said the Coal Board had received the report of Dr. Fleck and his colleagues on the organization of the industry. Having accepted the recommendations, it was busily engaged in implementing them. It was, of course, necessary that the administration of the industry should be as good as could be devised. Good administration would assist all at the pits.

It was well, in considering the tasks of the industry, to endeavour to answer the question, 'What does it need to get coal from the ground?' First, there must be coal in the ground, and they must know something of the geological and mining conditions; second, there must be 'capacity'—*i.e.*, shafts or drifts which gave access to the coal seams, and an underground transport system designed and equipped to enable coal to be got from the coal-face to the surface in sufficient quantity; third, there must be competent managament, aided by scientific, technical and administrative staffs; and fourth, but by no means least, there must be miners to carry out the manual operations. When the Coal Board took over the mines, the work of exploration had been going very slowly for several decades. The Board immediately set about increasing the pace. At present it was doing about as much boring each year as was done during the whole of the 20 years between the two world wars.

In most coalfields, productive capacity had been declining for many years, in some coalfields since before the first world war. The output of Lancashire and North Wales, for instance, declined from 28 mill. tons in 1913, to 18 mill. tons in 1937 and 13 mill. tons in 1946. More than half of that coalfield's capacity disappeared during the period. The Coal Board must not only prevent further decline nationally—which would proceed at the rate of 4 mill. to 5 mill. tons a year if nothing was done about it—but actually achieve expansion.

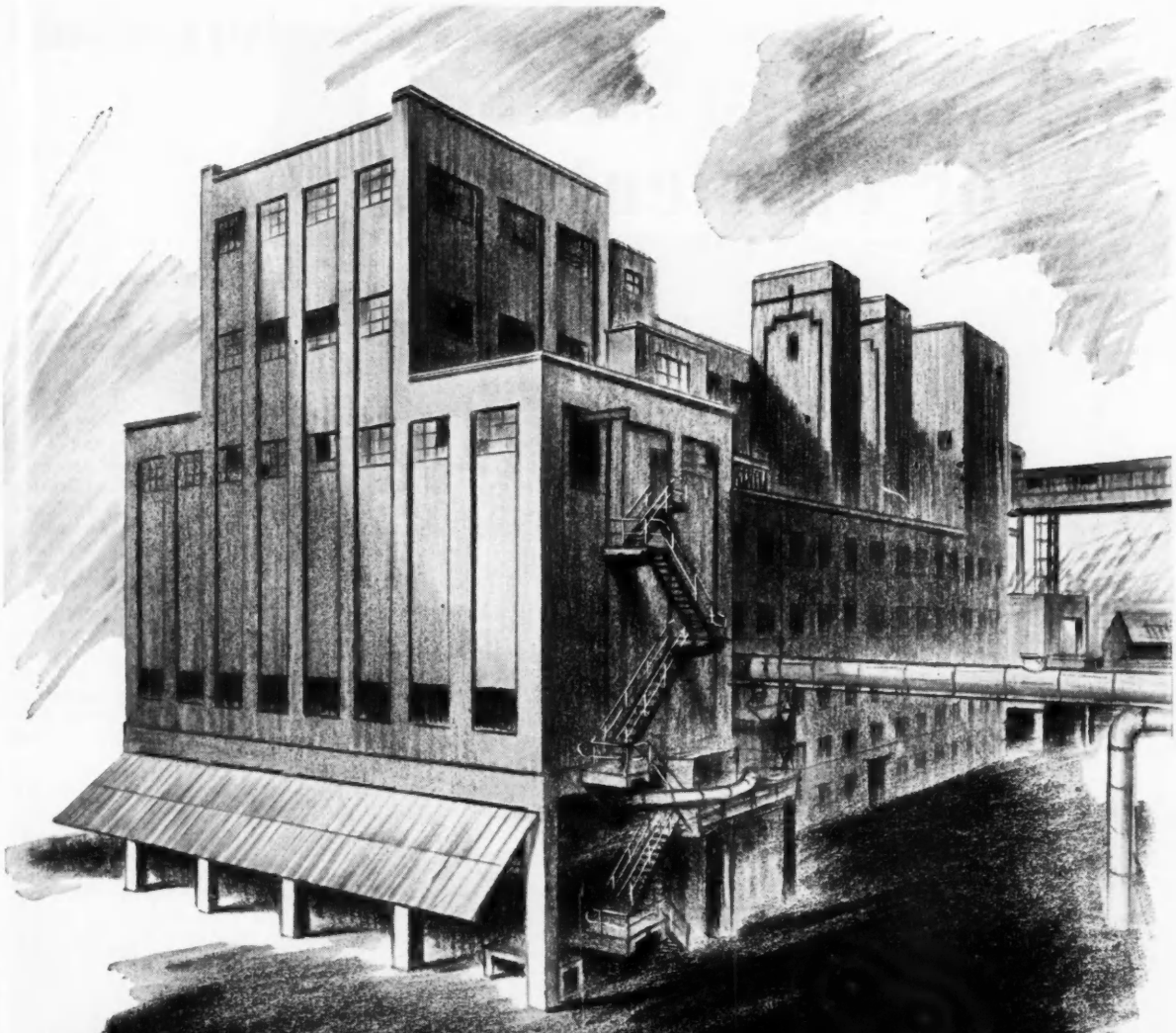
Never before had so much been demanded of the industry's staff. They must seek to maintain, and, as far as possible, to expand, current output to help to meet the ever-increasing demand for coal. They were expected, at the same time, to conceive, plan, and execute about 40 years of normal reconstruction work in 10 years. The Coal Board was trying to modernize the staffs, as well as the pits, and to ensure that there was a steady flow of able men into the industry, to encourage the flow of promising new ideas, and to improve the quality of administration and management. The better the administration, and the management, the greater the help to the miner to do his job.

The only continuous success with regard to the problem of manpower for the industry was the growth, year by year, in the number of juveniles in the industry, which in 1954 reached 37,500—about 1,000 more than the year before and nearly 11,000 more than in 1947. Indeed, juvenile labour was now 5.3% of the total manpower, as against 3.8% in 1947. With other manpower it was a disappointing story—5,700 men less on the average in 1954 than in 1953. Last month as compared with June of last year, there was a drop in manpower of some 3,000. The country's high industrial activity, with the great demand for manpower in less arduous employment, was the main cause of the difficulty. At the same time, the prosperity of industry caused inland consumption of coal in 1954 to leap by about 5 mill. tons, while the average manpower engaged in the winning of coal fell by 5,700. This year, the Board might have to face a further increase in inland consumption of possibly as much as 4 mill. tons, with a further fall in manpower measured in some thousands.

A nationalised industry owed a duty to those employed in it. It was right that those employed in this arduous and dangerous industry should have a fair and proper-reward for a fair and proper day's work. Since vesting day miners had attained the pride of place in wages. It was right that the working conditions at the pits should be made as good as was reasonably practicable. Working conditions had been greatly improved at many pits since nationalisation. It was right that proper steps should be taken to make the pits as safe and healthy as practicable. The Coal Board had done much, and fortunately with success, to improve the safety of the pits, and to promote the health of the mineworkers. It was right that those engaged in this industry should have proper welfare facilities both at the colliery, and in their communities. Again, money and effort had been expended freely to achieve this, and the miners and the Board had co-operated whole-heartedly in the promotion of social welfare.

The nationalised coal industry had a duty to the general body of citizens of this country—the consumers of coal. It was not surprising that there were many who considered that now that so much had been done for those who worked in the industry, more should be done for those outside the industry, the users of coal. This year the industry had already lost over 2 mill. tons of coal in six months by unofficial stoppages and 'go slows'—and that, in his opinion, was as great a challenge to their trade union leadership as it was to that of the National Coal Board. It was a loss of half a week's output in six months—*i.e.*, at the rate of a week a year.

'You have been dealt with fairly under nationalisation' concluded Sir Hubert. 'There are few of your members who would like to return to the past. They realize the great improvement which has taken place for them since 1946. A period of consolidation is now required. It is time to think of others—of the general public. We must work together to improve the output and the efficiency of the industry. It is worth-while even for the self-interest of your members; it is certainly worth-while for the country. It depends not only on the material things of the industry. It is largely a thing of the spirit.'



The new installation of

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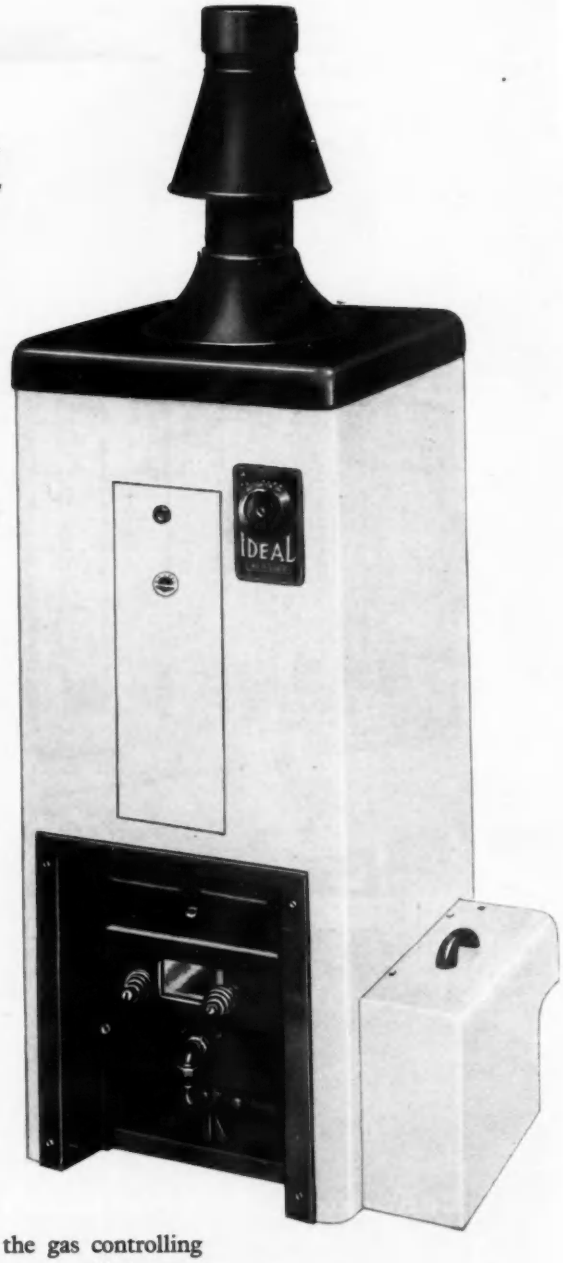

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Instrumentation and the Gas Industry

PART 2

In this series, A. Linford, B.SC., A.M.I.C.E., and G. C. Farmer, ASSOC.M.INST.GAS E., describe the development of instrumentation in the gas industry, the theoretical considerations underlying the design of instruments and also the practical aspects of their operation and maintenance.

PRODUCERS of one type or another are almost always employed for carbonizing processes today, the notable exception being coke-oven batteries which are under-fired with their own coal gas. This practice, however, is being steadily replaced as coke-oven gas is being distributed with gas grid schemes.

INSTRUMENTATION FOR GAS PRODUCERS

The producer is capable of providing large volumes of gas at a very low cost per therm and although a great many step grate producers have operated in retort houses completely devoid of any instrumentation, the coming of the external and mechanized producer has shown the way for great developments in both manual and automatic control of producer gas plant.

Automatic Control of Pressure

Where internal producers are employed with a common producer gas offtake to heat retort benches, a very successful system of pressure control has been widely adopted. This usually operates by means of steam flow regulation of the air injector which determines the rate of producer gas production. Controllers of both the pneumatic and the hydraulic types have been employed for this purpose, one pressure measuring and controlling unit being used to actuate the regulating valves situated in the steam mains feeding the producer injectors.

Obviously, careful manual supervision of the operation of the producers with regard to fire cleaning, charging, etc., is necessary to avoid unbalance of the load, causing one or more producers to become overloaded.

Measurement and Automatic Control of Blast Saturation Temperature

Another highly important variable which should be watched is the blast saturation temperature; depending on the type of fuel employed, the blast saturation temperature will lie in the region of 50°C. to 70°C. The careful control of blast saturation temperature is necessary for the following reasons:—

(1) The endothermic reaction produced by the decomposition of steam has the effect of reducing temperature near the fire bars and minimizing the heavy clinker formation. (In older producers water was allowed to trickle over the bars to achieve this end.)

(2) The passage of undecomposed steam through the producer cools the reaction zones by conveying heat from them to the upper part of the fuel bed.

(3) The reactions between steam and carbon absorb heat, and the addition of steam in moderate quantities serves in two ways to moderate excessive temperatures at the base of the producer which would otherwise cause clinker.

(4) A balance must be struck between the steam admitted, which absorbs heat, and the air admitted, which generates heat.

(5) Since the reaction between steam and carbon yields, essentially, a mixture of $CO + H_2$ having a calorific value of 318 B.Th.U. per cu.ft., steam admission increases the calorific value of the gas. When steam admission becomes so great as to cool the reaction zones, both reactions $CO_2 + C = 2CO$ and $H_2O + C = CO + H_2$ are repressed, which results in the CO_2 content of the gas becoming higher with a consequent fall in calorific value. In other words, the blast saturation temperature determines the optimum water gas reaction which can take place, so the control of this temperature enables the highest quality of producer gas to be obtained.

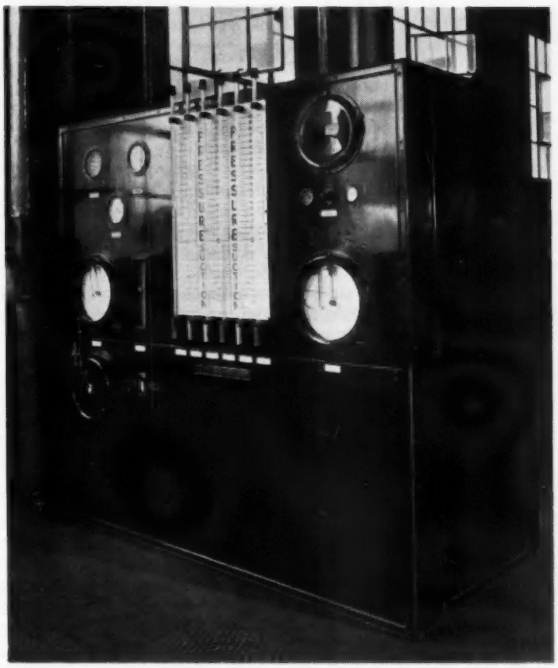


Fig. 13.—Instrument panel for a modern automatic gas producer.
(By courtesy of the South Eastern Gas Board)

In the control system described, the blast saturation temperature is controlled approximately by means of the steam ejector—the steam flow (and consequently the air flow) increases proportionately with the opening of the regulating valve. In larger producers, where air is blown in at the base according to the load demands, provision must be made to supply steam from another source for this reaction. Occasionally impulse turbines are employed with their pass-out steam injected into the blown air, but in most cases auxiliary steam is required. This auxiliary steam is regulated by means of hydraulic or pneumatic control equipment impulsed by a temperature-measuring instrument with its detecting element situated in the path of the incoming steam air mixture.

Either liquid expansion or electric methods can be used for ascertaining the steam temperature. Gas expansion and vapour pressure thermometers are also available, but with the latter the usual upper limit of temperature is of the order of 500°F.

All fluid-expansion type thermometers consist of a 'bulb,' subjected to the temperature to be measured, and a registering instrument which, in its essentials, is identical with a pressure gauge. The two elements are connected together by a capillary tube and the system is charged with the appropriate fluid. The change in volume of the filling liquid, occasioned by a change in temperature of the bulb, is reflected by an alteration in pressure within the system and this pressure, in terms of temperature, is registered by the instrument. In the instance of a vapour pressure thermometer, the system is only partly charged with a liquid, the registering instrument measuring vapour pressure, which is related to temperature.

In view of the principle of operation, these instruments are frequently referred to as pressure thermometers.

Various precautions must be taken in the installation of pressure-type thermometers. For example, account may have to be taken of the difference in level between the point of measurement and the instrument. Considerable care must be taken not to damage the capillary tube—if this is fractured, the equipment should be returned to the makers for repair.

In the electric resistance thermometer, as its name implies, the temperature detecting element is a coil of wire, the resistance of which changes with change in temperature. There are a number of circuits and types of electrical registering instruments in current use. The electric circuit may be of the Wheatstone bridge form operating in conjunction with a direct-deflection type of instrument, which detects the change in resistance of the temperature sensitive element by measuring the out-of-balance current. Alternatively, a self-balancing instrument may be used which automatically adjusts the bridge resistance until there is no out-of-balance, the magnitude of the adjustment being directly related to the resistance of the temperature sensitive element. Manually adjusted instruments of this description are also available. A potentiometer circuit can also be used with a self-balancing instrument, which automatically balances the potential drop across the temperature sensitive element against the potential drop across a standard resistance. In all instances, the electric circuit must be energized from an external source of power, *e.g.*, a battery.

Direct deflection instruments are ideal for temperature indication. When a record of temperature is required, since the output of power is very low, it is usual to avoid putting undue strain on the deflecting element by using an auxiliary mechanism to detect the position of the deflecter pointer and register this on a chart, *e.g.*, at regular intervals the pointer is depressed onto the chart, a 'typewriter' principle being adopted. On the other hand, self-balancing instruments, driven by an electric motor, have a powerful movement, and their accuracy is not influenced by changes in resistance of the leads and the characteristics of the deflecting element.

The thermocouple form of temperature detecting element consists of two wires, of dissimilar alloys, welded together at one end to form the hot junction—*i.e.*, the junction which is exposed to the temperature to be measured. The registering instrument is connected into the circuit formed by the two wires. The electromotive force generated by the thermocouple is proportional to the difference in temperatures between the hot junction and a point in the circuit known as the 'cold junction.' The cold junction may be contained in the registering instrument, in which case special, compensating, leads are required between the 'head' of the thermocouple and the instrument. When the cold junction is remote from the instrument —*i.e.*, in the vicinity of the thermocouple, standard cable can be used from this point to the instrument. Various methods are available for compensating for cold juncture temperature variations.

When the cold junction is contained within the registering instrument case, automatic temperature compensation is frequently incorporated. When the cold junction is at a distance from the instrument, it can be buried in the ground, or its temperature can be maintained constant by means of a thermostat, and the instrument adjusted to read the correct hot junction temperature. That is to say, due allowance is made for the constant, known value of the cold junction temperature.

A thermoelectric pyrometer generates its own electromotive force, so that when a direct indication of temperature is called for, a milliameter movement is used, no external source of power being necessary.

When the registering instrument is of the self-balancing form, a potentiometric circuit is used, the electromotive force generated by the thermocouple being balanced, either manually or automatically, against a constant electromotive force which may be provided by a dry battery. When the balancing is performed automatically—*i.e.*, when the instrument is of the recording pattern, an external source of electric power is required to operate the equipment.

The useful features of resistance thermometers and thermoelectric pyrometers may be summarized as follows. The registering instrument can be located at a considerable distance from the measuring point and at any level relative to this—the connection between the two elements is an electric cable. The temperature-sensitive element can be replaced at any time with the minimum of trouble. The basic principle of operation renders it possible to use one instrument with a number of different temperature-sensitive elements located at different measuring points. The instrument can be connected manually to any one of a large number of measuring points for spot reading.

Alternatively, by means of using a self-balancing instrument, a number of temperatures can be recorded on one chart, the instrument automatically selecting the points in a predetermined sequence.

Self-balancing instruments may be 'mechanical' or electronic in operation. In the former, the out-of-balance is detected by mechanical equipment, which involves the use of a galvanometer. In electronic equipment, the out-of-balance is detected and greatly amplified by electronic valves, the output from which is used to energize a reversing motor which adjusts the circuit resistances. The vast power amplification renders this direct operation possible without applying any load to the input circuit. The reduction in the number of moving parts and the high speed of operation has resulted in the widespread use of electronic instruments for multi-point temperature recording.

INSTRUMENTATION FOR WASTE-HEAT BOILERS

Waste-heat boiler installations have become an essential part of all modern carbonizing plants which do not employ intermittent recuperative systems—*e.g.*, the coke-oven battery. The efficient use of the waste-heat boiler has done much to improve the thermal balance of a retort house and the overall efficiency of gas production. However, there has been a tendency to

Fig. 14.—Typical waste-heat boiler instruments.

employ waste-heat boilers to generate steam at the expense of using more producer gas than is required for the heating of the carbonizing unit; consequently, saleable coke has been used for steam raising and the term 'waste-heat boiler' has become a misnomer. However, the market price of coke always determines the economics of this method of operation.

A wise use of instruments on the waste-heat boiler plant can keep a careful check on its thermal efficiency.

Measurement of Temperatures

The temperatures above boiler inlet and outlet are very critical in this connection. Too high an inlet temperature can indicate maladjustment of the heating arrangements on the setting, and too low an outlet temperature can become a menace by bringing about condensation of sulphur dioxide in the boiler flues, with its resulting corrosive effects. Temperature measurement, therefore, is an essential adjunct to the efficient operation of a waste-heat boiler, and the same forms of temperature measuring equipment as used for steam are applicable here.

Other Measurements

In line with standard boiler house practice, the measurement of feed water flow and temperature are desirable together with quantity of steam generated, and, of course, steam pressure as well. These instrument applications are standard in all respects. Mention may be made, however, of the fact that on occasions, feed water flow is measured by a weir meter; the essential requirement here is that the water is under atmospheric pressure—it must be metered on the suction side of the feed pump.

A point of extreme importance is that, when the feed pump is of the single cylinder, double acting type, a differential pressure form of flow meter should not be used as flow pulsations produced by the pump will result in inaccurate registration. In these circumstances, a suitable form of 'mechanical' meter or shunt meter should be installed. The operation and design of a shunt water meter is identical in all respects with the shunt meter used for steam flow measurement.

Gas Analysis

In a modern continuous vertical retort setting, additional air is sometimes added to the waste gases to ensure complete combustion before they are passed to the waste-heat boiler. By measuring the percentage oxygen content of the waste gases before they enter the waste-heat boiler, a check can be kept on the effectiveness of the combustion, and this measurement is also a guide as to whether there are any air leaks into the duct between the settings and the inlet to the boiler.

Occasionally, auxiliary producer gas flues, directly connecting the producer to the waste-heat boiler, are used to obtain greater steam output so as to obviate the necessity for any auxiliary boiler plant on the works. This practice is not generally considered to be economic and its success depends on the prevailing market price for saleable coke, since this fuel is being used to generate steam via the producer. When the steam generating plant is operated in this manner, efficient combustion conditions can be promoted, and operational economy thereby achieved, by measuring the oxygen content of the gases within the fire-box and tubes of the waste-heat boiler.

In the past, the universal practice has been to maintain a check on combustion conditions by measuring the percentage of carbon dioxide contained in the waste gases, and by keeping this percentage within prescribed limits. Fundamentally, the factor which determines the efficiency of combustion is the amount of oxygen available for combination with the combustible constituents of the fuel. A certain volume of air, in excess of the theoretical, is necessary to attain complete combustion, and the percentage oxygen in the waste gases is directly related to percentage excess air, this relationship not varying greatly with the nature of the fuel. While the carbon dioxide content of the waste gases is a guide to percentage excess air, the relationship varies widely between different fuels. In addition, serious errors are possible, *e.g.*, when hydrogen is present and measuring equipment of the thermal conductivity type is used, since hydrogen has a thermal conductivity approximately six times that of nitrogen—the main constituent of flue gases.

Within recent years, industrial equipment has been developed for measuring the oxygen content of gases, the principle of operation being based on the paramagnetic properties of oxygen. All matter, including gases, is influenced by a magnetic field. The great majority of gases are diamagnetic since they seek the weakest part of a magnetic field. Oxygen, however, is one of the few exceptions, it being strongly paramagnetic, and is attracted into a magnetic field. The only other important gas having paramagnetic properties is nitrous oxide, but its properties are very much weaker than those of oxygen.

Two different methods have been developed for utilizing the magnetic properties of oxygen for detecting its presence. In one, a magnetic wind is produced, while in the other, the force resulting from the presence of the gas in a magnetic field is measured.

In the magnetic wind form of equipment, the gas sample is drawn through an annular ring with a diametrical by-pass. The by-pass is heated by passing an electric current through two identical windings, forming part of a Wheatstone bridge, and it is subject to an asymmetrical magnetic field produced by a powerful permanent magnet. The gas sample enters at the bottom of the annular ring and flows round both sides, the streams joining together at the outlet at the top of the cell. Owing to its paramagnetic properties, the oxygen is drawn into the by-pass where it is heated. Increasing the temperature reduces its paramagnetism, and it is therefore displaced by fresh cool gas, a 'wind' being developed in the by-pass. The 'wind' results in a difference in temperature of the two windings and this, in its turn, results in a difference in the two resistances. A standard form of self-balancing electrical instrument registers this difference in resistance in terms of percentage oxygen.

When the force principle is utilized, the cell, subjected to an asymmetrical magnetic field, contains a dumb-bell shaped element suspended on a fibre, and the deflection of this element is determined by the difference between its constant paramagnetism and that of the gas sample.

The deflection of the element is detected by reflecting light from its surface onto a photo-electric cell assembly; as it deflects the intensity of light falling on to one cell is increased with a corresponding decrease in light intensity falling on the other cell. The resultant out-of-balance potential developed by the photo-electric cells is amplified and registered, in terms of percentage oxygen, by a conventional form of electronic instrument. A null-balance measuring system is also used in which the detecting element is subjected to an electrostatic potential opposing the force produced by the presence of the gas sample. The opposing potential is automatically varied to maintain the detecting element in its central position, under which circumstances there is an equal and opposite output from the two photo-electric cells. The opposing potential is measured and registered by the instrument in terms of percentage oxygen.

It may be stressed that, as in the instance of all gas analysis equipment, particular attention must be paid to the sampling system—any-difficulties experienced can usually be traced to this source and not to a fault in the analyzer or measuring instrument.

INSTRUMENTATION FOR CARBURETTED WATER GAS PLANTS

For many years the water gas process has been the standard peak load plant for the gas industry, and it has been the most useful adjustment for the coke market from season to season. Water gas plants have always required careful technical supervision to ensure economical use of gas oil, efficient production of gas and the avoidance of unpleasant effluent problems.

Measurement of Weight of Coke

Coke allocated to water gas plants from the retort house in most cases is accounted for by weight, and the equipment employed for this purpose is similar to that already described for handling coal to retort houses.

Measurement of Oil Flow

Oil, the other raw material in the process, is generally measured by some form of 'mechanical' meter, which gives a reading on a counter of the total quantity consumed. Among the forms of 'mechanical' meters available for this purpose is that which employs a semi-rotary piston as the measuring element. The design is identical with that used for domestic metering in waterworks practice, the only difference being in the materials of construction. The oil flows through a cylindrical chamber containing the piston, which is also of cylindrical shape and of the same height but of smaller diameter than the chamber. The piston is constrained to oscillate about a radial partition which forms a fixed seal between the meter inlet and outlet, the piston forming a moveable seal

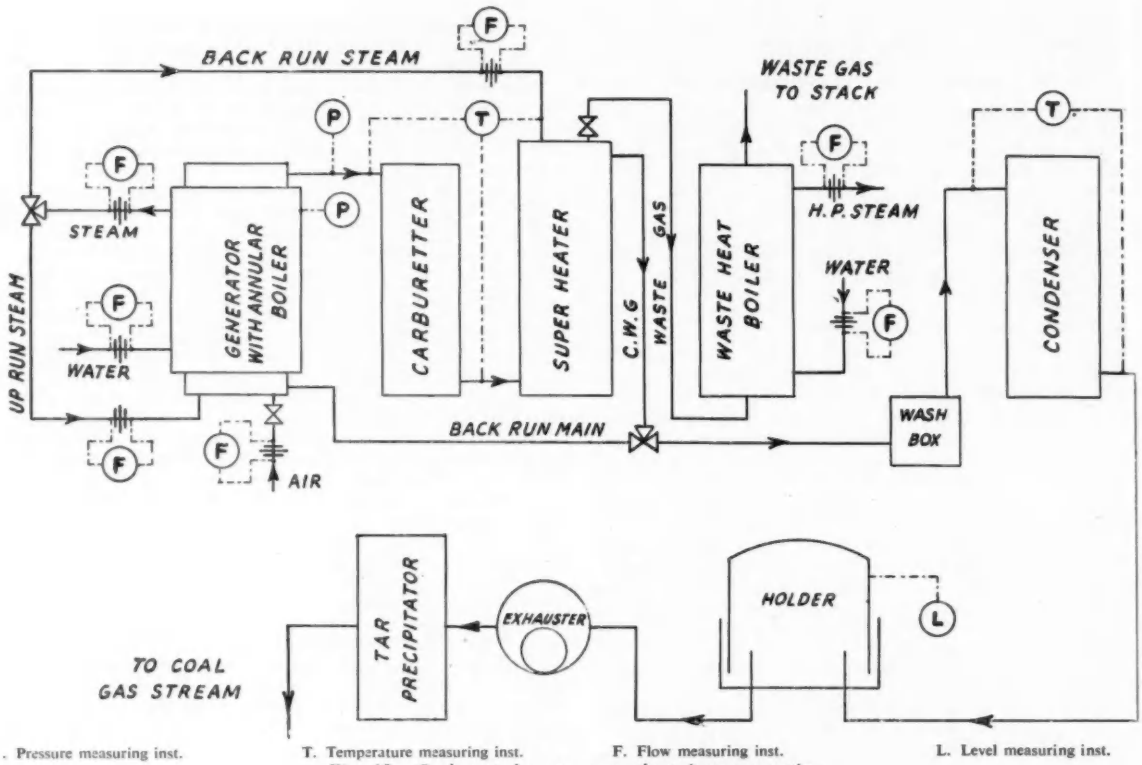


Fig. 15.—Carburetted water gas plant instrumentation.

which is displaced by the oil, under which action the inlet and outlet ports are alternately opened and closed. The volume swept out by the piston during each cycle is equal to the volume of oil passed through the meter in this time. Through a train of gears the piston displacement is transmitted to the counter mechanism.

Fig. 16.—A carburetted water gas control panel. (By courtesy of the South Eastern Gas Board.)

A relatively recent development is the double piston form of mechanical meter, in which two cylindrical pistons, geared together, slide backwards and forwards on axial shafts, and at the same time oscillate radially as the oil flows through meter. The combined reciprocating and semi-rotary displacement causes the pistons to open and close the meter inlet and outlet ports in the correct sequence, the volume swept out by the pistons again being equal to the volume of oil passed through the meter.

Another form of oil meter which may be mentioned is that in which the measuring element takes the form of two helical gears mated together in a similar manner to a gear pump.

Measurement of Pressure

The measurement of pressures of gas and air at the various stages of water gas manufacture is of the highest importance. Simple water column gauges have been used in this application almost exclusively, although the reliable slack diaphragm-type of low pressure indictaor has recently found popularity. These operate on the principle of a calibrated spring deflected by a slack leather, oiled silk, or plastic diaphragm. Instruments employing capsule bellows have also been used but have not stood up to the arduous duties encountered on the plant.

(To be continued)

£100 MILL. GAS ISSUE

The Gas Council is issuing £100 mill. of British Gas 4% Guaranteed Stock, 1969-72, at a price of £98%. This stock will be in addition to the £80 mill. of similar stock issued in August, 1953, at 99%. Lists open tomorrow, when 10% will be payable on application. The first payment of interest, at the rate of 30s.%, will be made on February 6, 1956. The proceeds are to be used to repay temporary borrowing and to cover capital expenditure and provide working capital. Gas stock issued since vesting date totals £295 mill. and comprises £40 mill. of 3% stock issued in May, 1949, £75 mill. of 3½% stock issued in July, 1951, £80 mill. of 4% stock issued in August, 1953, and the new issue of £100 mill. of 4% stock.

What is the Purpose of Industrial Relations?

Our Industrial Relations Correspondent discusses the problem of the efficacy of the treatment of human relationships in industry.

WHEN a country is suddenly afflicted by a spate of grievous and costly industrial disputes, there is a wave of confused reactions among the public because it has to suffer, as a consequence, both in comfort and expense—and often in actual need. All sorts and conditions of people rush into print, some for the strikers and others against. Some of the bolder or, shall we say, more reckless spirits rush in where angels fear to tread. Regardless of the fact that they have had no experience in this complicated field, and have not applied any serious study to it either in theory or practice, they produce out of the hat, as it were, all kinds of solutions and remedies which will once and for all put matters right. Politicians, journalists and lawyers tumble over one another in their eagerness to offer their own special prescriptions and recipes. And then the strike stops and these pedlars of philosopher's stones retire once more into the relative obscurity of their normal vocations a little surprised, perhaps, at their own boldness, but not a little chagrined that their panaceas were not enthusiastically received as final solutions by an externally grateful public.

It is a good thing, however, that people normally outside this province should take an active, if transient, interest in such problems. Indeed, it is essential that a democracy should think round these questions all the time—just as it should think of foreign policy, of the cost of living, of education, of the system of local government, and the like. But we cannot, everyone, be specialists in all these fields. The most we can hope for, outside our particular line of country, is a smattering of knowledge, a glimmering of understanding of the main issues.

For industrial relations (or personnel management) have now become a profession; although of relatively recent growth and recognition, they have now come to be regarded as of first rank importance. They present an almost virginal field with tremendous scope for research and experiment. Hitherto, one has looked in vain for reliable and trustworthy precedents. But there have been very little research and study as yet, relative to other subjects. Statistical jargon such as 'hands,' 'labour force,' 'industrial complement,' 'manpower' and the like have served to obscure what would otherwise have been obvious. The material of industrial relations is men and women of flesh and blood at work, and each has an inviolable individual personality.

Character of Industrial Relations

How can we classify industrial relations among the other activities of mankind? They are partly a science, because they have to deal with facts: statistics of all kinds, wages and salaries, prices, numbers employed, data relating to conditions of service, factors affecting cost of living and the like. But human beings are in no way tractable like materials or mathematical figures. To assess and anticipate their reactions in any given circumstances is the hardest and most baffling of tasks. As in other fields, so in this, scientific collection of facts must be followed by analysis; but this in turn must be followed by psychological assessment, for the facts must be adapted to the human factor to which they apply.

Again, knowledge of, and experience in, education is a great asset to those concerned with industrial relations. Industry must at all times be actively concerned with the training of the minds and hands of its employees in conjunction with educational institutions of all kinds and, also, with welfare in all its aspects. The care of the young through apprenticeship and other schemes is another of industry's unavoidable and permanent responsibilities.

Industrial relations, too, impinge very much on the field of law; for they give rise to contracts, either through national or regional agreements, or individual contracts of service with individual employers. But it is difficult, in practice, to give such contracts the normal force of legal enactments. Courts of law are faced with great difficulties when asked to bring force to bear on large masses of people. Consequently the highest wisdom in industrial relations is directed to securing conformity by persuasion and voluntary acceptance rather than by threats and intimidation of the police or other Government officers. There is, of course, a considerable field of industrial legislation relating to such matters as industrial injuries, safety and welfare in factories and the like, and the practitioner in this field must know and study it. And there the normal processes of law can apply, for the issues normally relate to one or two individuals responsible.

A Practice and an Art

The practice of industrial relations is also an art. The practitioner, if he is on the union side, must, of course, represent the interests of the union members; and if on the employers' side, those of the employers. But the task is not as simple as that. The interests of all are interwoven and in the ultimate they are the same: the prosperity of all those employed in the industry. There must, therefore, be mutual confidence and trust between employer and employee. There must be co-operation between all the parties concerned. But the art required to bring this about successfully is a very considerable one. It involves the ability to get on with all sorts and conditions of people, and win their respect. It requires courage and statesmanship to tell one's side that a certain course of action which expediency dictates is ultimately to redound to the benefit of few, if any, people, and to the credit of none. In short, the art to advocate an unpopular policy is always difficult. Humility and not conceit is the prime need—humility to seek patiently for the right answer, and not the conceit which claims to know all the answers. Fairness and justice to all the interests concerned must be the guiding stars, and not a disposition to be cunning and evasive and a desire to seek the smart way out.

Strikes, lock-outs and ideological conflicts leading to strife are an indication of the kind of incompetent and inexperienced hands into which these matters of high moment have been, and still are, placed, whether by employers, trade unions or the Government. This is due to the fact that skill, experience, ability and certain qualities of personality have not, hitherto, been regarded as indispensable necessities in this profession. And here is a note of warning. Let no man have executive authority in this field who is without these essential qualifications, for he will otherwise be a misery to himself, a danger to his members, and an expensive nuisance to the community. No country and no industry can afford him.

Essential Principles

The efficient conduct of industrial relations or personnel management must be based on the acceptance of certain fundamental tenets, resulting in the recognition of certain essential principles. Let us examine some of the more important of them.

If the prime purpose of industry is to satisfy the needs and desires of the consumer—for without the consumer there would obviously be no industrial activity—then consumer satisfaction must be the chief ultimate purpose of all those engaged in industry, both employer and employees. If that contention is true, then it follows that the ultimate interests of all concerned in a particular industry must be the same. In many quarters, however, it is contended that there must always be a conflict of interest between the employer and the employee. There must be, it is argued, two 'sides' in any industry, each 'side' always striving, separately, to reach what it conceives to be its own special goals, and reaching them, if necessary, at the expense of the other party. Every personnel manager worth his salt, any trade union official who is concerned, not with politics, but with the best interests of his members, must reject this philosophy as complete and dangerous. One of the fundamental truths is that, if an industry is to prosper as much as it should, then the basic underlying community of interest between all the parties

engaged therein must be recognized; and that recognition must be actively fostered at all times.

Facile generalizations, hasty judgments, intuitions, hunches, prejudiced reactions have normally no place in the field of industrial relations. Colours in human relations do not resolve themselves into simple blacks and whites. There are infinite gradations of grey. If there are grievances, fancied or real, the fault can never lie with one 'side' only. The lawyer, the schoolmaster, the politician, the old-fashioned 'boss' can, perhaps, afford to adopt a prejudiced view based on emotion, class prejudice, or expediency; the industrial relations practitioner, whether on the union or employers' side, does so at the risk of wrecking the industry, his union, and possibly the nation. He must base his opinions on facts, patiently gathered—facts which are incontrovertible. If he is hasty in his judgments, if he allows his 'side' to sweep him along on a wave of ill-considered resentment, if he truckles to unjustifiable threats from the other 'side,' he will have established a precedent which will haunt him for the rest of his working days. He must withstand such temptations. He must have the courage of his convictions. He must preach the truth as he sees it, based on a dispassionate analysis of the facts. For this he will be accorded no recognition, nor will he receive any gratitude. His satisfaction must lie in the preservation of peace and harmony, in the establishment of justice and fairplay, and in the gradual and steady improvement of employer/employee relations. To him truth must be greater and more permanent than expediency, justice more valuable than prejudice, principles more sacred than deception.

Labour Not a Commodity

And he must not forget the cardinal principle that employees cannot be regarded as commodities like bricks or motor cars. Phrases like 'labour complement,' 'heads,' 'manpower,' so beloved of civil servants and statisticians, must not blind him to the fact that those engaged in industry are men and women, infinitely various with their individual personalities. True, labour (like a commodity) sells itself—its energy and skill—for a price. But there the similarity between men and women and material commodities ends. Labour is not as mobile as commodities—there are handicaps to mobility of labour such as houses, wives, schooling, relatives, and expense. Again, the reactions of a motor car are normally assessable in any given set of circumstances. Those of labour are at all times incalculable. Labour cannot, moreover, wait indefinitely for a buyer of his energy and talents. He has no reserves, and his expenses continue all the time. He has also civic and political rights and obligations. Furthermore, adjustments are expected of him which are required of no material commodity—adjustment to his inferiors, his colleagues, his superiors, to the social life both within and without the factory gates. The industrial relations officer must, therefore, decline the 'help' of pedlars of quick and easy remedies, firmly if courteously, knowing that he must always bear in mind that his concern is with the most complex of all units of behaviour—man.

He must also remember that he can only rarely rely, like the lawyer, or engineer, on precedents. Each situation that arises in the field of industrial relations usually has a unique character. Nothing quite like it has ever happened before. Not only the factors governing the situation are entirely new, but the set and clash of personalities involved in the situation are peculiar to that situation alone. The great help and assistance given to the lawyer by case-law, to the engineer by mechanical laws, are not his anywhere to command. He must study a new group of facts, a new set of circumstances, a new array and impact of personalities in every new situation that arises.

The efficient practitioner in this field must also remember that industry has both an external and internal social aspect. The external social purpose is to provide the community with a progressively efficient supply of consumer goods—that is to say, to maintain and increase the standard of living of the community. As Mr. Henry Ford put it: 'A standard of living is not a question of money, but of things and opportunities. People are prosperous and enjoy a high standard of living when great numbers of them can afford a great many things and services—refrigerators, cars, radios, homes, good food, education, recreation, and all the rest. Through the peacetime use of the tool of mass-production, American industry has already made this country a land with an incomparably high standard of living.' Anything on the human side which interrupts the active flow of such consumer goods will, therefore, be the active concern of such a practitioner. He will feel, among his other responsibilities, his responsibility as a citizen to the community; that is to say, to do all in his power to ensure that constant flow of services which the community needs.

Importance of Fair Play

He must accept as a fundamental principle in his work—'do unto others as you would be done by.' Is it reasonable to expect human beings to give of their best in dirty, unhygienic and unnecessarily dangerous conditions of employment? Is it conducive to discipline and morale that the lazy, the incompetent, the flatterer, the sycophant should be accorded greater recognition than the skilled and conscientious employee? Is it fair, is it just, is it in the interests of industry that the wire puller, the schemer should attain the highest positions, while the honest and decent workman of hand and brain is passed over? These are no new factors in industry or society—they are as old as humanity itself. But we must be constantly reminded of the permanently right principles. The pages of history are strewn with warning examples of nations, institutions, and industries which have ignored them, and, in consequence, dissolved into nothingness.

But the competent practitioner in industrial relations cannot afford to ignore them. His constant concern must be with the permanent satisfactions caused by their recognition, if the climate of opinion and feeling in the factory and in the office is to be conducive to efficient and enthusiastic productive effort. He may, of course, become cynical and sceptical of their value. But his cynicism and scepticism will become infectious. And he will soon be caught up in a climate of human relations where his services will become worthless, and indeed, dangerously so. Loyalty will disappear. Labour turnover will acquire alarming proportions—the most expensive item in any industrial budget. The reputation of the firm will suffer outside the factory gates. Consumers will not readily buy goods produced in a firm when they are aware of its ill-repute in the field of industrial relations. The industrial relations officer will find that cynical disregard of principle does not ultimately redound to the interests of anyone, least of all to the interests he represents.

Education and Training

The responsible worker in the field of industrial relations must also have an invincible belief in the value of education and training. He must know that a man on top of his job, whose competence has been tried and tested both in theory and practice—whether he is a skilled mechanic or a manager—will be a better and happier member of the firm, than the one who bungles through his job by hunches, traditional practices, and other irrelevant signposts.

For he will always be aware that the face of industry, of the market place, and of society generally, is constantly changing. Lack of adaptability, an inelastic attitude to new problems of production and employer/employee relations will, he knows, mean falling behind in the race. Vested personal or procedural methods will be so much grit in the wheels of progress. The vital line of demarcation between knowing and not knowing will become blurred and obscured. All these things, however, ignored and not realized by others, will have an ever-present compelling interest and importance to him. And he will have no choice but to preach day in and day out the gospel of knowing, and the fatuity of ignorance. He will say that to fail to spot exceptional talent and provide it with facilities for further training and education is shocking waste. He will do his best to destroy the illusion that an industry can afford to ignore current ideas and experiments in this vital sphere.

And this instinctive aversion to waste will extend to the field of selection. He will not be satisfied until, wherever possible, all square pegs have been taken out of round holes and placed where their skill and talents obviously are of greater use. Malassortment of individuals in ill-suited jobs will offend against his view of the fitness of things, and he will do his best to correct it.

The industrial relations officer must also constantly realize that employees are not merely creatures of flesh and blood. They have minds and feelings as well. They will, therefore, be healthily curious about the whys and wherefores of their industrial activity. They will want to ask questions; and they will want to make suggestions. The workers in this field must, therefore, throw his whole weight behind joint consultation.

He will realize that two heads are better than one, and fifty better than three. He will know that a man who spends his whole working life in a certain unit of employment may very well be in a better position to suggest improvements therein, than someone only remotely connected with it. He will not expect miracles immediately. Suspicion, lack of mutual trust, fear of trespass and interference on both sides will die hard. But his faith in the ultimate worthwhileness of a two-way traffic in the exchange of ideas and information will remain undiminished by initial disappointments and frustrations.

Procrastination, in the case of incipient trouble, must be anathema to the industrial relations officer. A Polish Corridor situation will not be regarded by him, as it is so often by politicians, with supine equanimity, for he will know that it will inevitably blow up and cause suffering to countless people. Where there is a situation obviously fraught with danger, he must immediately do his best to alter it and remove the threat. Our railway and docks and mining industries always seem to be sitting on top of a volcano. What are the reasons? Cannot they be eradicated rather than be accepted as inevitable? A proficient industrial relations man would not rest until he had found them; and having found them, done his best to remove them. Trouble, therefore, hardly ever takes him completely by surprise. He has learned to read the signs in advance. He can discern them afar off. And he instinctively does everything possible to ward off ensuing trouble.

A worker of any standing in this field will not be afraid to learn. He will not close his mind to any new ideas, however fantastic they may seem initially. He will easily spot the efforts of quacks and amateurs. But any new ideas with the weight of authority and experience behind them he will examine with anxious care. He will try, therefore, to keep abreast with the latest thought and practice in his field, in all countries. This will entail sacrifice of time and money and effort. But he will think all this worth while. Apathy, indifference, or complacency are ill-suited tools in this constantly changing sphere. The worthy practitioner will be prepared not only to receive information, but also to impart it. He should be a guide, counsellor and friend to all who call upon his services. His advice may not always be accepted. He will not always be infallible. Who is? But he will give of the best that is in him, and be satisfied with that.

These are some of the main factors which determine the purpose of industrial relations or personnel management. The need to organize in this regard and to study the problems in this field will remain with society for ever; and there is no study more worthwhile, no activity more essential, than that of industrial relations.

COKE OVEN MANAGERS' YEAR BOOK

The Coke Oven Managers' Association has produced its *Year Book* for 1955—the 36th edition published in successive years. It reflects continued progress in the activities of the Association and a further net increase in membership, the present total of all classes being 543 compared with 513 a year ago. The transactions have again been edited by Mr. R. Neumann on behalf of the Editorial Committee, and the *Year Book* forms a complete record of the year's proceedings, including the annual meeting and dinner. The papers cover a very wide field, and thanks are expressed in the preface to the authors for maintaining a high standard of excellence. The demand for the *Year Book* increases annually in Western Europe and in the United States, and pride is expressed regarding the many tributes received from those countries relating to the publications of previous years, with which the latest edition compares very favourably.

GAS EQUIPMENT IN COVENTRY'S NEW HOTEL

On the left is the main kitchen, showing the gas-heated central range, gas grill, fish fryer, and stockpot stove. The photograph on the right shows the dining room service, with hot closet and service counters, gas grill, and an electrically heated egg boiler.

The current issue of *Carron Cupola*, house magazine of Carron Company, describes the kitchen equipment installed in the new Hotel Leofric, Coventry. In the rebuilding of Coventry, the Hotel Leofric rises seven storeys high as a magnificent example of modern architecture. The name was chosen from many suggestions made by the citizens of Coventry at the directors' request. Coventrians asked that Leofric, Earl of Marcia, and husband of Lady Godiva, should be remembered in the planning of their new city centre. The Leofric will be operated by Ind Coope and Allsopp, Ltd. (Brewers), as lessees.

The contract for the cooking and ancillary equipment was entrusted to Carron Company. The plans for the complete installation were prepared at Carron, and the general cooking scheme comprised a large gas heated range with bain marie, stock pot stove, fish fryer, wet steaming ovens, steam jacketed boiling pans, electrically heated baking oven, grills, and hot closets.

For the services to the main dining-room, banquet, restaurant and grill room, steam, gas, and electrically heated hot closets and counters were supplied and installed. These were fitted with stainless steel tops. Gas heated tea and coffee urns were also installed. Among the many machines Carron Company installed were dishwashers, silver burnisher, potato peeler, mixer, mincer, waffle iron, egg boilers, slicer, etc.

All the sinks were supplied and installed by Carron Company, and these were of stainless steel, and it should also be noted that the crockery, silver, and glass storage cabinets were made in the joinery department at Carron Works.

The members of the Midland Section of the Institution of Gas Engineers assembled in the new Leofric Hotel on the occasion of their summer meeting on July 1.

DISSIPATING FUEL RESOURCES

By D. C. HENDERSON, M.Inst.Gas E.

BRITAIN is today enjoying an industrial boom such as never before in history, and large scale unemployment and acute poverty are, we hope, forever relegated to the past. 'Export or die' is, however, the only maxim we dare accept since we have nothing other than coal and our native skill and craftsmanship to barter for our raw materials and foodstuffs.

The gas industry is entirely dependent upon home requirements and while we make a not insignificant contribution to the export market by providing a refined fuel service to the factory and coke for the Continent, our welfare and future depends upon a healthy employment level within our shores. Since coal is our only indigenous raw material, and responsible for our past and present industrial growth, one would expect us to be unsparing in our efforts to conserve this wasting asset but, alas, our prodigality is bent upon perpetuating the wastefulness of our forefathers.

What Future Generations Will Say

In an age of technical skill and knowledge, that we should continue to burn coal in the raw state with efficiencies ranging from little above zero to 30%, while carbonization offers 75 to over 80% return, must inevitably label us as wanting in commonsense. Future generations will undoubtedly curse us for our folly in wantonly allowing their heritage to be frittered away. Governments of this country have appointed in succession Egerton, Simon, Ridley and Beaver Committees to consider such matters, and monumental reports have been issued and discussed with an air of gravity while action on any one is still awaited. Though it is too early to expect much from the latter, it is interesting to examine the former and see how far we have progressed.

Post-War Building Studies No. 19 (Egerton Report) records a mass of information regarding the domestic heating, cooking and living habits of the nation, tabulates our likes and dislikes, standards of ventilation, fuel availability and expenditure, efficiencies of utilization, etc., etc. In 1945 this report was hailed as a blueprint for the future and in 1955 we speak of heating, ventilation, insulation, and hot water requirements as being to 'Egerton Standards' and unfortunately regard them still as something to be discussed rather than implemented.

In 1946 a Fuel and Power Advisory Council appointed by the Ministry of Fuel and Power under the Chairmanship of Sir Ernest Simon reported its findings. This Committee's terms of reference were 'to consider and advise on the use of fuels and the provision of heat services in domestic and similar premises in the interests of the occupants and of the nation with special regard to the efficient use of fuel resources and the prevention of atmospheric pollution.' Various recommendations were then made with the object of raising the standard of comfort and reducing by increased efficiency the overall fuel requirements. Emphasis was placed upon the need for free competition between gas and electricity for domestic heating and cooking, and yet today the gas industry is constantly required to bring to the notice of local authorities the need to provide dual services to ensure 'freedom of choice' in order that it may be allowed a measure of security in offering its services to the general public.

Importing Coal

In 1955, with a falling coal output necessitating the importation of coal from America and the Continent, the three nationalised fuel industries are actually encouraged to waste their resources of money and man-power in competing with each other for the housewife's favour, while the nation bleeds to death in the absence of a national fuel policy. Surely 'freedom of choice' in these circumstances is indefensible and a luxury we can no longer afford. The sensible and efficient utilization of the nation's remaining natural wealth should be removed from politics and sectional interests, since we can, quite simply, either recover 20% or 80% from each ton of coal and, conversely, make one ton do the work of four tons.

From the British Electricity Authority's report for the year ended March 31, 1954, it is observed that the thermal efficiency of all steam generating stations was 23.4% and the fuel consumed per unit sent out was 1.352 lb. (average C.V. 10,782 B.Th.U. per lb.), thus—

14,577 B.Th.U. coal = 1 B.O.T. unit = 3,412 B.Th.U.

Surely, an extravagant means of providing a refined fuel, however efficient it might be as a source of power. Contrast this with the gas industry's contribution where the thermal efficiency is 80% and one ton of coal (average C.V. 13,400 B.Th.U. per lb.) yields 75 therms of gas, 135 therms of coke (10 cwt. at least equivalent to 12½ cwt. coal), five therms as benzole, 25 therms as tar, a total of 240 therms.

The case for carbonization is so strong as to leave one wondering why the industry is shy to publicize the fact that 10 cwt. of coal converted to gas will cook for a family of four for 12 months, while electricity, to achieve the same objective, would require 18 cwt.

A Tidy Investment

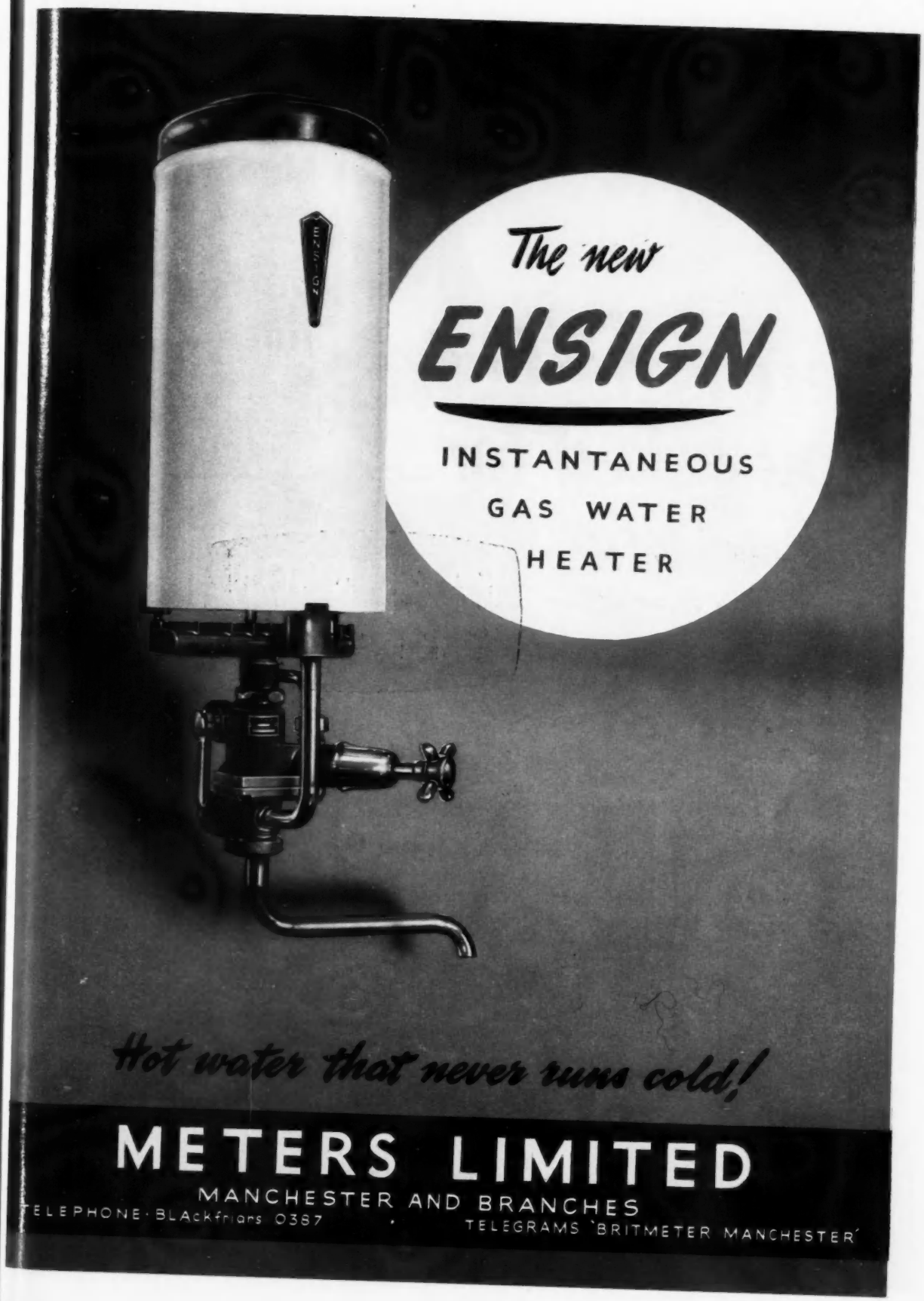
Turning now to the Gas Council reports, we observe that in the five year period 1949-54, the total number of consumers rose from 11.8 mill. to 12.47 mill. and that the gas-using public purchased gas equipment from area boards amounting to a total of £118 mill. (£44½ mill. in cash and £73½ mill. in hire purchase). This is roughly equivalent to £10 per consumer over the period, or £2 per annum. That is quite a tidy investment judged by any standard, and the *Electrical Times* in an editorial some months ago, while paying a sincere tribute to the aggressiveness of the gas salesman, bemoaned the fact that this equipment was sold and not hired and, therefore, their prospects of dispossessing us of the business next year or the year after was not too bright. Assuming the average value of each applianec sold to be £15, then the total number purchased is between 7½ and 8 mill., and this means that two out of every three of all consumers purchased one major gas appliance over the past five years. While not forgetting the gap between 1939-45, when appliances were in short supply, let us also remember that pre-war and in the early post-war years, individual undertakings pursued an equally progressive sales policy and you will realize that we have practically re-sold the domestic market in the past 14 peace-time years.

Hire Purchase Problems

Despite this tremendous example of public confidence in our commodity, which in effect is a gigantic insurance for the gas industry, there are many who still hanker for simple hire and long term hire purchase. These advocates would do well to recall the middle thirties when our competitors were so actively aggressive, when just as we issued a dozen appliances to the district, so another dozen were being returned to the depot. Simple hire and long term hire purchase can be a handicap rather than an aid, since the consumer is reminded quarterly of the charges to be met and when the hire charge is coupled with the gas account, often mistakenly consider our service to be expensive. Many having embarked on one hire or hire purchase transaction will not countenance another until the first is redeemed. Shorter periods and more frequent payments could be profitable, particularly if we zealously follow-up with another attractive offer as the original agreement is terminating. This is a feature of furniture trading and we could with advantage study their marketing methods. In a period of full employment, high wages and rising standards of living, it is remarkable that only the refined fuel services should consider it necessary to spread the payment of £20 over seven or ten years, as was the case prior to the recent introduction of the Hire Purchase and Credit Sales (Control) Order, 1955.

While there has been a substantial increase in the number of domestic users, there has been a gradual decline in the amount of gas sold to this class of consumer, despite the high rate of appliance sales. The position is serious and warrants thorough investigation, since while 53.61% of all gas sold is used domestically, the revenue obtained is 61.5% of the

* From the Presidential Address to the Yorkshire Junior Gas Association presented at Huddersfield on May 11, 1955.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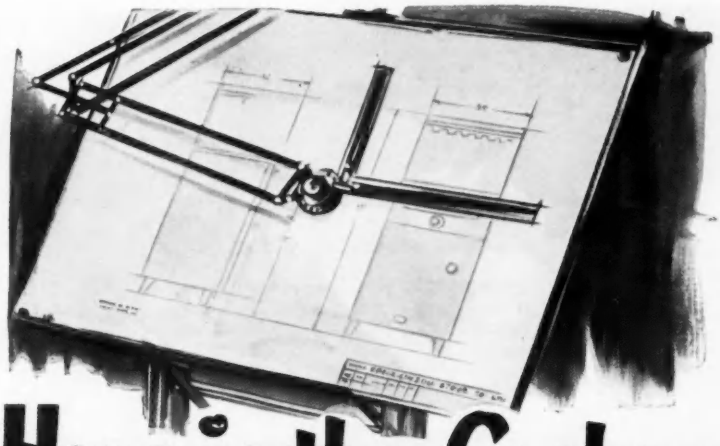

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It is neat and compact yet it provides ample facilities for cooking both on the Hotplate and in the Oven.

It is fitted with safety taps which are named for positive identification.

The red badge, the red oven tap and the red lettering on the hotplate taps make a subtle and attractive contrast to the brilliance of the cream vitreous enamel finish.

BRIEF SPECIFICATION:

Interchangeable Top Bars and Burners ★ Reversible Hotplate ★ Enamelled Grill Cover ★ Fixed or Loose Enamelled Crown Tray, as required ★ Chromium-Plated Lighter Elbow ★ Embossed Oven Linings.

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DIMENSIONS:

Height	53″
Width (*Including Lighter Elbow*)	22″
Depth (*Front to Back*)	23″
Oven: Height	16″
Width	16″
Depth	13¼″
Hotplate: Width	19¾″
Depth	17¾″

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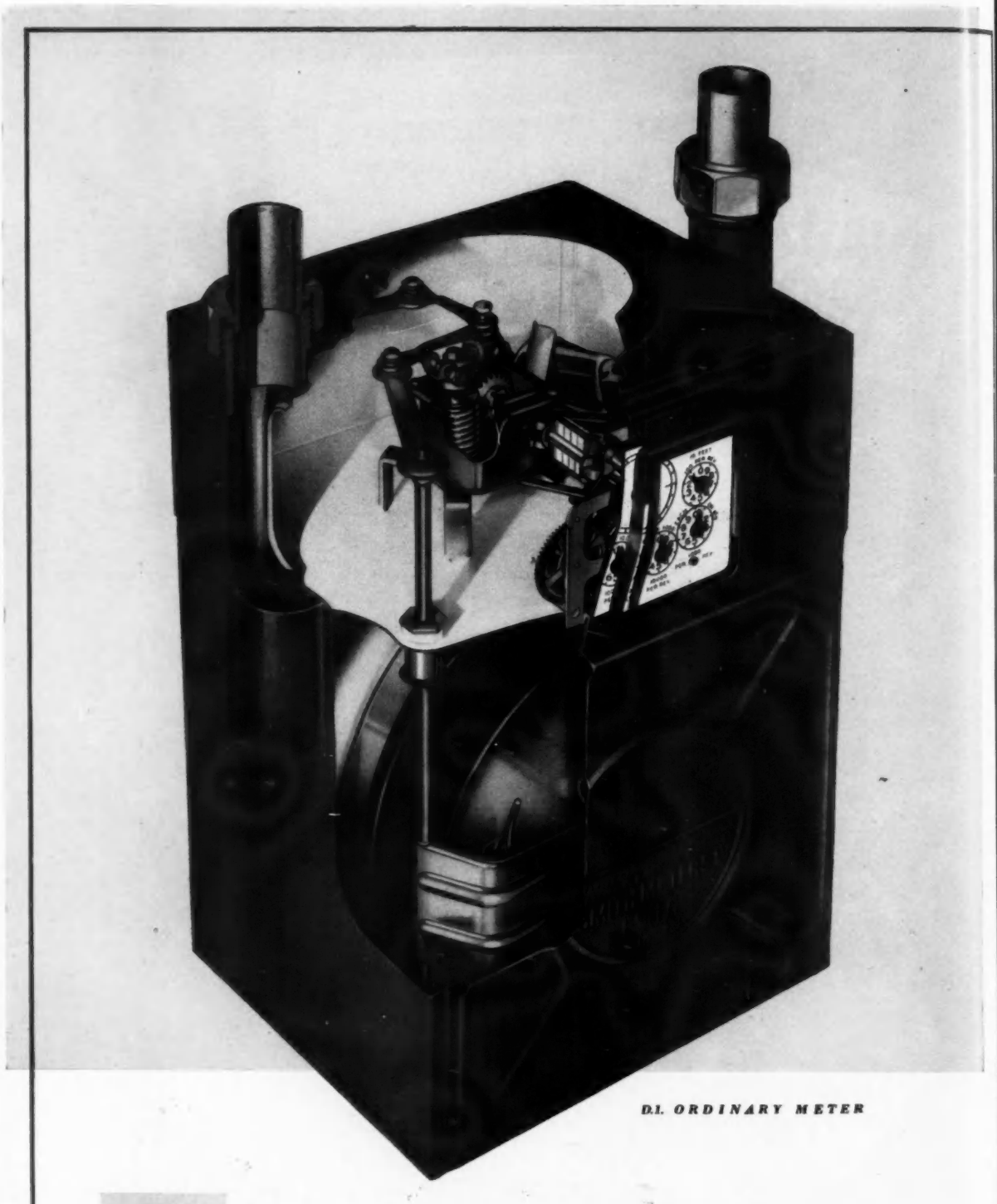


D.1. ORDINARY METER

Smith Meters *Limited, 186 Kennington Park Road, London. S.E.11*

total income from gas sales. There is a dangerous tendency to regard the decline as resulting from the improved efficiency of modern appliances, but this influence must of necessity be slight, as the 1800 vintage cooker long since found its way to the scrap yard or, alternatively, adorns our museums.

Cheaper Gas Therm Paradox

Present-day social changes have a much more definite effect. In 1939 the family dined at home and the mid-day lunch was responsible for the bulk of domestic gas sales. Today, few families maintain that habit. Canteens, school feeding centres, restaurants and snack bars cater for the mass and, where evening meals are required, then tinned meat, soups, and packaged vegetables, cooked ham and salads, requiring minutes to prepare are the general fashion. Home baking has been replaced by the confectioner and bulk bakery, while launderettes and modern detergents have effect upon the wash-day load. These are real and permanent changes in the social structure and the gas industry must accept them and develop new outlets.

It is paradoxical, however, that while the nation eats at work or in the restaurant and uses gas for the cooking process, reducing the overall demand because the food is cooked in bulk, it also attracts a cheaper gas therm, being grouped with legitimate industrial processes.

The commercial gas load is exclusively cooking, space and water heating, and one is tempted to ask how much of the industrial load is also used for exactly the same purposes in providing bodily comfort and physical well being? Certainly the industry is in a difficult position as a high priced domestic therm is necessary to sustain a lower priced commercial or industrial therm. If we lose the former we cannot maintain the latter. Yet, as more and more capital expenditure is incurred to meet the needs of industry, the domestic user must pay a still higher quota of the overheads for a lessened requirement.

Mr. K. T. Spencer, C.B.E., M.C., Chief Scientist to the Ministry of Fuel and Power, in a recent paper entitled 'Fuel Availability and its Efficient use' quotes:—

Variation between best and worst yields per ton of coal consumed in various industries

Industry	Highest yield	Average yield	Lowest yield
	Tons		
Building bricks			
Continuous kilns	44.7	8.8	4.8
Intermittent kilns	16.7	5.0	3.7
Bronze and brass founding			
Billets and ingots	20.0		1.7
Castings	2.5		0.2
Grain drying	224.0		5.6
Iron and steel			
Rolling and re-rolling of ingots	15.0	4.0	1.0
Laundry	5.0	1.0	0.4
	Barrels		
Beer	112.0	40.0	18.5
	Tons		
Biscuits	20.0	2.0	1.0

Observe the wide diversity between the lowest and the best yield per ton of coal consumed and realize that fuel costs in industry cannot be so vital a factor in overall production costing, as it is so often claimed, or drastic action would be taken to close the gap. With examples such as these, it is difficult to understand why town gas with all its inherent advantages of cleanliness, controllability, freedom from transport, handling, stoking and storage costs cannot command a higher price than 12.2d. per therm. To quote the price of fuel oil as the real competitor is to beg the question. Can the coal-gas industry ever hope to compete with the vast oil companies in many of the markets in which they operate without risking ultimate exhaustion?

Average Household Expenditure

Nationally, the average householder expends approximately £30 per annum on fuel, represented by:—

£6 for electricity	(equal to 940 units at 1.532d.).
£9 for gas	(equal to 115 therms at 18.5d.)
£15 for coal	(2½ tons at £6 average).

Measured in terms of convenience, cleanliness, etc., the electricity and gas costs are reasonable, providing the basic needs for lighting, power, cooking and laundry services together with a proportion of supplementary heating.

With the gradual implementation of the Beaver Committee recommendations it would not be too optimistic to anticipate that the gas industry could provide in the prescribed smokeless zones, 150 gas therms and two tons of coke per dwelling, against a raw coal requirement of three tons or, alternatively, 225 therms of gas and 30 cwt. of coke, with practically no change to the domestic budget for the first combination and a modest increase for the second.

Perhaps with such an attractive prospect, we dare hope that a combined gas-coke tariff might be devised, and looking beyond our habitual tariff schemes we might consider selling to the owner-occupier the equipment and the gas and coke at an all-in figure during, say, the first four years of occupancy.

One of the most promising developments in the appliance field today is the combined gas ignited open coke fire with an additional gas fire provided in the front trivet for occasional use. There are difficulties to be overcome in protecting the gas fire element from ash clinker and coke dust and also against radiant breakage, but the attraction of providing a dual fuel service in the lounge or living room at a low cost with a single installation offers tremendous possibilities.

Metering

Again quoting from the Gas Council Reports, 1949-54, the total number of new meters tested was 3.83 mill. and the total of repaired meters 2.95 mill., making a grand total of 6.78 mill., which means that something over half of the total meters in use were renewed or repaired during the period under review. Assuming an average value for new at £5 each, and for repair at £3 each, then the cost is approximately £28 mill., or £2 6s. per consumer, plus transport and installation costs, which is quite a heavy outlay.

The question arises, would an oil spray *in situ* obviate the need in many cases for the meter to be brought in for repair?

Present-day appliances differ little from pre-war models in respect of thermal efficiency although the higher rating of hotplate burners gives a much speedier service. External appearances have greatly improved and the colour range now on offer meets the most fastidious requirement. The difficulty of providing pan stability and good combustion standards is in constant conflict with the householders' paramount need for easy cleaning and there are signs that manufacturers are being pushed too far in the interests of the former. An early post-war cooker manufactured by a newcomer to the industry, provided with a flat black enamelled top with loose inset pan supports, stainless steel burners (all interchangeable with each other) fixed air intake and gas injectors, had distinct possibilities but received little encouragement.

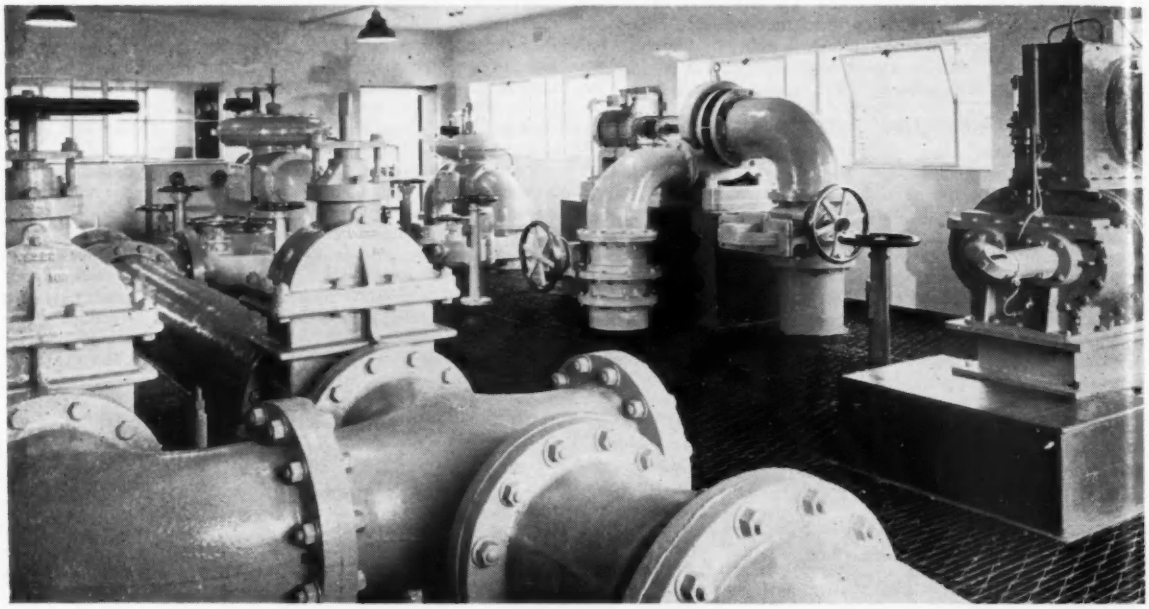
Wash Boilers

Thermal efficiencies have been improved in recent years, but the present-day lighter gauge copper pan is to be deplored since the life of the appliance revolves around the weight of metal incorporated. Local authorities may become increasingly concerned with the maintenance and replacement costs of these appliances when compared with their electrical counterpart. Condensation trays are an essential requirement but are not yet mandatory on all boilers, and a recent revision of the appropriate British Standard Specification still leaves the issue open. Manufacturers are rendering a dis-service to the industry by offering boilers without this refinement to local authorities, particularly since its provision would only add 1s. to the cost of the appliance.

Water heater maintenance has been greatly improved with the introduction of corrosion resistant interiors. There is a regrettable tendency to revert to outdated techniques using interlocking gas and water controls requiring manual operation, when the public have already been sold and accepted the theory of automatic service by gas.

Gas Fires

Thermal efficiencies are improving slowly with convection allied to radiation. Neat gas burners have become firmly established but, unfortunately, the heat source in post-war designs tends to recede into the fire front and the horizontal distribution curve is shorter than is desirable to warm persons sat slightly off centre. Research is required to investigate the heat loss due to chimney draught when the appliance is fitted close to the fire surround.



The main plant room at Bromsgrove holder station. The control room window can be seen at the rear left.

Remote-controlled Holder Station at Bromsgrove

THE Bromsgrove District of the West Midlands Gas Board, with an annual consumption of some 300 mill. cu.ft., is now supplied with gas in bulk from Redditch, 7½ miles away. The old and uneconomic gas producing plant has been closed down and the works remains only as a holder station. In order to make the most effective use of compressor and trunk main capacities, gas is supplied into the station at a constant rate throughout the day and fluctuations in district demand are absorbed by the use of an existing 500,000 cu.ft. three lift, spirally-guided gasholder. A comprehensive remote control and indication system has been installed, first, because it was economic to do this in preference to the alternative of employing shift attendants at the holder site and second, because it is highly desirable for the shift supervisory staff at Redditch to have up-to-the-minute information of, and control over, conditions at Bromsgrove, where the local demand forms a relatively substantial portion of the total output from the Redditch manufacturing station. The indicating and control equipment is the well-known A.T.M. system supplied by the Automatic Telephone and Electric Co., Ltd., and operates over one pair of telephone lines rented from the G.P.O. In principle, physical measurements of gas pressure, gas flow and holder stocks at the holder station are converted into electrical codes which are then transmitted to the manufacturing station, 'de-coded' and shown again as physical quantities on suitable instruments. Control of such operations as the loading of a governor at the holder station is effected by setting in motion a train of electrical impulses which operates a reversible electric motor and so alters the position of a cam which in turn varies the spring loading on the auxiliary control governor.

Interior of control room at Bromsgrove. The local pressure gauges and recorders, and the volumetric governor auxiliary controls can be seen through the window.

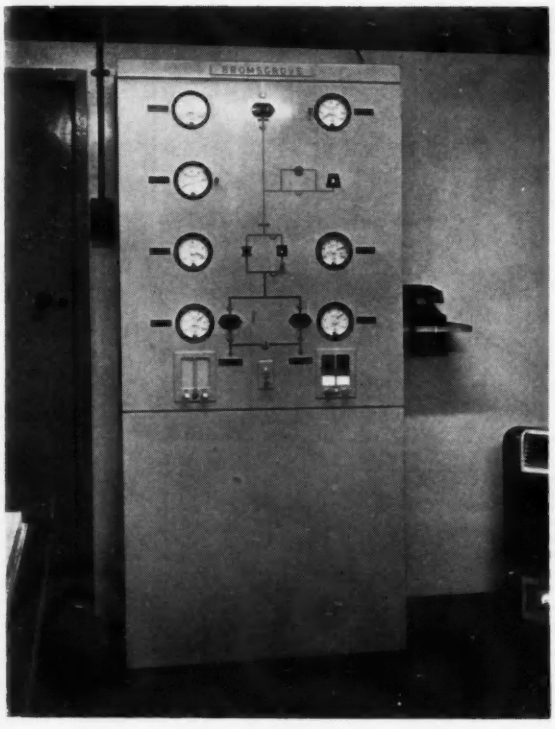
In the system at Bromsgrove gas at approximately 5 lb. per sq. in. pressure enters the station through the main shown in the foreground of the title block, and passes at a controlled rate of flow (normally about 50,000 cu.ft. per hour) through a volumetric governor. From the governor outlet gas flows either to the holder, or to the district after passing through a Connersville meter, an electrically driven booster or ts

automatically controlled by-pass, and the North and South Bromsgrove district governors. To guard against inadvertent over-inflation of the holder a gas-operated system is provided which closes the volumetric governor valve independently of the normal remote control system, when the holder is almost full.

There is also a limiting pressure device to guard against excessive pressures on the outlet of the volumetric governor which might arise, for example, if the holder inlet valve was closed. The booster is normally started or stopped from Redditch, but if the inlet governor pressure falls below a pre-set value it is started automatically by a local pressure switch. To safeguard the holder crown from collapse a contact is provided in the holder height 'coder' to prevent the booster being run when the holder is empty. The two district governors are loaded by auxiliary gas systems fitted with inspirators giving a range of control up to 15 in. W.G. outlet pressure.

Adjustable Stops

Adjustable stops are fitted to the control assemblies to prevent inadvertent lowering of the district pressures below a pre-set minimum; each governor is also fitted with a device which prevents district pressures falling below a safe minimum if a fault should arise in the auxiliary system. All equipment



The control panel at Redditch, carrying a diagram of the Bromsgrove holder station system.

in the main plant room is flameproof; heating is by tubular heaters thermostatically switched on at 40-50°F. The cubicle in the centre of the control room houses the relay groups which transmit and receive trains of indication and control impulses over a direct G.P.O. line connected to the control panel at Redditch.

Mounted upon the left-hand side of the wall behind the cubicle are the instruments which convert inlet high pressure, inlet governor pressure and the two district pressures into electrical codes. On the right-hand side are two ring balance type meters which provide at Redditch selected indications of inlet gas flow or gas flow on to the Bromsgrove District. Mounted below these are the two district low pressure alarm switches, and the booster pressure switch.

The motors controlling the volumetric governor and the two district governors are mounted on the glazed partition wall between the control room and the main plant room, and drive the loading cams through gas-tight glands. The local control panel, and the telephone having direct communication with the Redditch control room can also be seen on this wall. The trickle charged batteries which render the control gear independent of the main electricity supply for some hours are in a compartment below the floor of the control room. The height of the holder is converted into an electrical code through a wire rope, attached to the crown, which unwinds from a drum operating a series of contacts. This equipment is mounted outside the building.

The control panel here illustrated carries a mimic diagram of the installation at Bromsgrove. The dials on the left from top to bottom indicate the inlet high pressure, flow to district, inlet district governor pressure and North Bromsgrove district pressure. One the right are instruments showing flow into the station, gasholder stock and South Bromsgrove district pressure.

Push Button Control

The representation of the gasholder carries a green light normally; if the holder is approaching full an amber light shows and when it is nearly empty a red light flashes, and an audible alarm sounds. In the square representing the booster a green light indicates that it is stopped and a red light that it is running. If the booster is started or stopped locally (for example by the pressure switch) the appropriate light flashes and an alarm sounds. Alterations to flow of gas into the station, or to the district pressures, are carried out by depressing the appropriate key on the mimic diagram and pressing the increase or decrease push buttons on the lower right-hand side of the panel. Each depression of the button alters flow or pressure by one fixed increment.

If faulty conditions arise, such as low district pressures, or fuse or mains failure at Bromsgrove, the alarm sounds and an appropriate illuminated wording appears on the lower left-hand panel. The plant at Bromsgrove is housed in a brick building 49 ft. by 25 ft. with a single-span flat roof on pre-stressed concrete beams. The grid floor of the plant room is 5 ft. above ground level to accommodate the interconnecting mains beneath. The governors and booster are by the Bryan Donkin Co., Ltd., and the A.T.M. remote control system by the Automatic Telephone and Electric Co., Ltd.

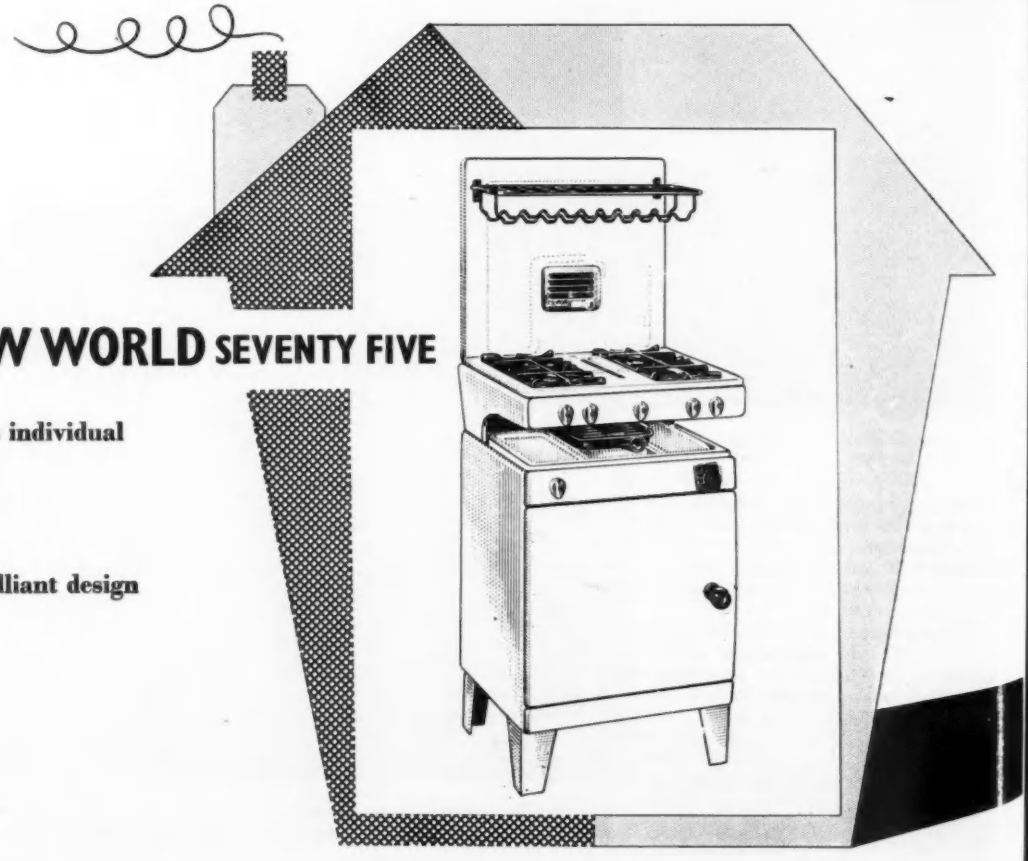
GAS IN AXLE PRODUCTION

Upwards of 100 railway wheel axles per shift are being made in a new £150,000 forge at the Ickles works of Steel, Peech, & Tozer, Rotherham. The forge, which is housed in a special building, has been designed for speedy operation, minimum of handling, and close technical control. Steel blooms from the Company's Templeborough rolling mills are first heated to 1,250°C. in a continuous gas furnace, then held in a 6,000 lb. manipulator during forging under a seven-ton steam hammer. After forging, the axles receive heat treatment prior to normalizing or oil quenching. Finally, they are straightened in a 150-ton press and cut to the correct length. Apart from those supplied direct to customers in the 'as forged' condition, the axles are sent to another local concern—Owen and Dyson, Ltd., also in the United Steel group—for machining.

The continuous furnace which has a width of 8 ft. 6 in. and an effective length of 37 ft. 6 in., is provided with one main end charging door and two side discharging doors which are arranged for simultaneous operation by one valve controlling the hydraulic lifting cylinders. The blooms are pushed down the furnace by an electric pusher, the normal heating period being approximately five hours. Heating is by low-pressure coke oven gas from five head burners and three secondary burners, each burner having a capacity of 3,500 cu.ft. of gas per hour. Air is supplied by an electric fan. The temperature is controlled by manually-operated gas and air valves, continuous readings of gas and air flow and furnace temperature being recorded on an instrument panel.

The heat treatment furnace is heated by 20 low-pressure burners using coke oven gas. The discharge end of the furnace is fitted with automatic control to assist in regulating the temperature of the axle within fine limits. Both the charging and discharging doors are power-operated by 2 h.p. electric motors.

VALUE FOR MONEY



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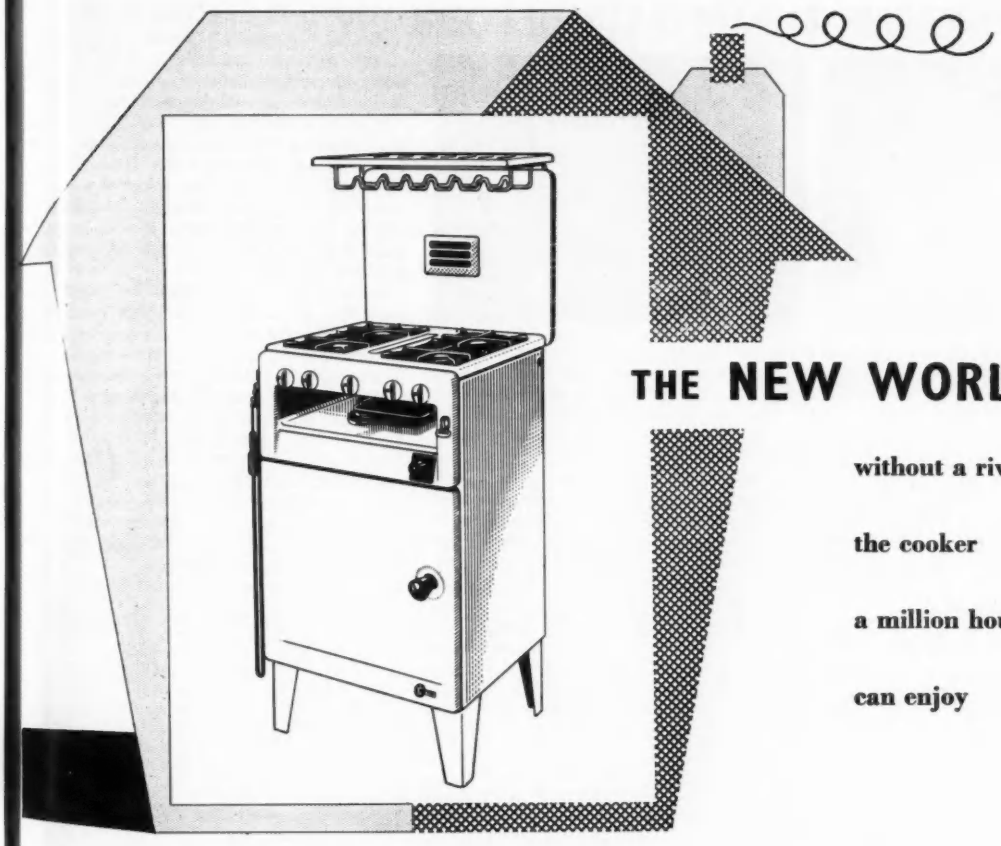

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TYNESIDE WINDOW DISPLAYS

Some effective window displays have recently appeared in the chief showroom windows of the Tyneside Division of the Northern Gas Board at Newcastle-upon-Tyne. One features a large diameter wheel revolving at a slow speed with cut-out models of appliances pivoted to the spokes. The hub of the wheel portrays a scale model of a section of a modern kitchenette, complete with model refrigerator, sink unit, cooker and sink water heater, which remains stationary. The theme of the display is 'The Kitchen is the Hub of the Home, and Gas Ensures its Smooth Running.' The wheel, cut-out lettering, and cards, are painted in bright colours which showed up most effectively against a dark background. The second display, the title of which was 'Four out of Five Housewives Cook by Gas,' was in effect an enlargement of the Northern Gas Board's recent publication with the same theme. Cut-out figures and cards were superimposed on a suspended plaque.

Old Folk and Gas Leaks

As a safeguard against accidents caused through leakages, a large scale check-up of gas fittings and appliances in the homes of old people living alone has been started by the North Eastern Gas Board in Leeds and throughout the area. An official of the Board says that old people, because they sometimes lose their sense of smell need a particular degree of protection, and this is being provided by examining fittings which might be defective.

Meter readers and fitters are helping with lists of addresses, but the Board is also seeking the help of voluntary organizations so that the maximum number of houses can be visited. In some cases repair work is done by the Board, and in others landlords are informed of the work needed to be done.

In one area 763 houses occupied by old people were inspected, and of these 54% were found to be satisfactory, 33% revealed a small escape which was put right straight away, but a further 9% revealed more serious leakages.

Feeding a Scottish Multitude

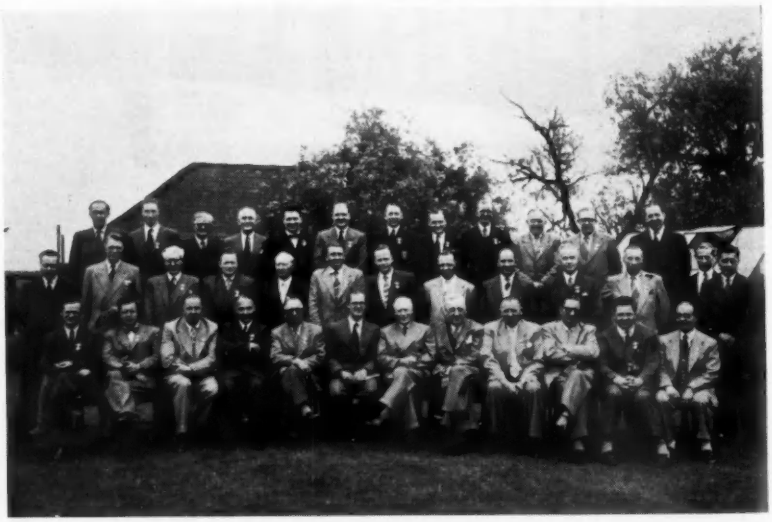
A Juvenile Rally of the Loyal Orange Institution of Scotland held at Cowdenbeath last month was one of the most spectacular events in the town for many years. It was estimated that 15,000 people took part, and a procession which took 55 minutes to pass a given point was accompanied by 44 bands. Over 60 buses and six special trains brought contingents from all parts of Scotland. The Cowdenbeath undertaking of the Scottish Gas Board, under Mr. W. T. Gilchrist, District Manager, took a vital part in the feeding of the multitude.

All the juveniles were provided with boxes of eatables and drinking cups, and the problem of providing tea for so large a gathering led to a novel experiment on the part of the Gas Board. After consultation, Mr. Gilchrist designed and arranged for the laying of a temporary supply of gas by main from a neighbouring road direct into the public park in which the assembly was held.

By using 30 double concentric rings coupled direct to the main it was possible to supply during the afternoon 600 gal. of boiling water for tea making. The pipes were laid into a specially erected marquee. Credit for the success of the enterprise is shared with Mr. Gilchrist by Mr. J. D. Beattie, the local gas distribution foreman, the operation being controlled throughout the day under his supervision.

The related problem of providing an adequate water supply on the spot was solved by the ingenious method of securing the loan of a static 500 gal. capacity tank from the Dunfermline Fire Service. The water was conveyed to the tank by hosepipe from the nearby premises of Given & Paton, a firm of printers. As a result of this co-operation it was possible to have 8,000 cups of tea available when the head of the procession entered the park, and this ensured a smooth running tea service for the rest of the day.

INTERNATIONAL VISITORS AT EDMONTON WORKS



International Foundry Congress delegates photographed with their hosts during their recent tour of the works of R. & A. Main, Ltd., at Edmonton.

As part of the comprehensive programme of works visits arranged for delegates to the 1955 International Foundry Congress which took place in London during June, a party of 30 delegates visited R. & A. Main's factory at Edmonton. They were welcomed at Gothic Works by Mr. R. C. Perry, Works Manager, and Mr. A. J. Adam, Chief Chemist, and spent a morning in touring the works foundries and associated departments, in which they were, of course, particularly interested, and the pickling and enamel shops. On completion of the tour the visitors were entertained to luncheon by the Directors of R. & A. Main, Ltd.

In proposing a vote of thanks, Mr. J. F. Stanier, Director, Renishaw Iron Co., Ltd., said how impressed the delegates had been by the organization and efficiency they had seen throughout the departments visited.

Mr. C. Marley, Joint Managing Director, R. & A. Main, Ltd., in reply, said how pleased he and his co-directors were to welcome delegates of the International Foundry Congress, and continued, 'We are happy to know that those departments which we have been privileged to show you have proved so interesting. Our only regret is that, in the limited time at your disposal, it has not been possible for us to show you the whole works.' Mr. Marley specially welcomed the Continental delegates.

Mr. J. Wortley, General Manager, who speaks German fluently translated Mr. Marley's words of welcome, and, in a general discussion which followed, replied to technical questions put by the German delegates.

MIDLAND SECTION SUMMER MEETING

There was a good attendance of members and their ladies at Coventry on July 1 for the summer meeting of the Midland Section of the Institution of Gas Engineers. Prior to lunch the members were given the opportunity of inspecting the Foleshill gasworks. As Mr. H. F. H. Jones, Senior Vice-President of the Institution, said, the works was a reflection of the ability of Mr. A. Allen, Divisional General Manager of the Warwickshire Division and Chairman of the Midland Section.

The carbonizing plant at Foleshill is housed in three separate retort houses and consists of Glover-West continuous vertical retorts of some 23 mill. cu ft. capacity per day. The visitors were able to see waste heat recovery by a closed cycle hot air turbine driving an electrical alternator in the No. 1 retort house.

There are two automatic carburetted water gas plants, one by Humphreys & Glasgow, Ltd., and the other by Power-Gas Corporation, Ltd., with daily rated capacities of 2.4 mill. and 3 mill. cu.ft. respectively.

New installations of ancillary plant consist of hot and cold electrostatic detarrers, Reavell turbo and electrically driven exhausters, wet and dry purification plants, also electrically driven compressors and booster. An interesting feature of the electrically driven exhausters is the automatic speed control by means of an electronic servo system controlling a scoop type fluid drive.

Foleshill works is directly connected to the main distribution centre at Gas Street, Coventry, by a boosting main. Birmingham, Rugby, Kenilworth, Leamington, and Warwick take supplies from the high pressure ring main system which is a feature of the Coventry distribution system.

While the members were inspecting the works the ladies went to St. Mary's Hall, where they were received by the Lord Mayor and Lady Mayoress of Coventry. The Hall is a superb specimen of 14th century civic architecture and has been the scene of the installation of all the Mayors and Lord Mayors of Coventry since 1346.

The lunch took place in the Hotel Leofric, a new hotel in the centre of Coventry where modern architecture and contemporary design are rearing up to provide and stimulate discussion on the subjects. Mr. G. le B. Diamond who had at the Institution meeting recently spoken on the subject delivered his forthright but favourable views on Coventry's boldness and vision. He said Coventry is a boom town. The car factories can offer a man a much larger pay packet than the essential public services can. Hence the West Midlands Gas Board has only 45 fitters in the Coventry area. It could employ 200. Mr. Diamond paid tribute to those men who had stuck with them, despite the lure of the larger pay packet.

The Lord Mayor of Coventry, Alderman T. H. Lewis, replying to Mr. Diamond's toast to the City, spoke also as a member of the old Gas Committee, and congratulated those who, under nationalisation, had taken over the Coventry gasworks. He particularly mentioned how pleased he was to see his old friend Mr. Percy Langford present. Mr. Langford, a well-known personality, was for many years in charge of the undertaking at Coventry.

Mr. J. Corrigan, Senior Vice Chairman of the Midland Section, in an admirably crisp speech, proposed the toast of the East and West Midlands Gas Boards.

Mr. Sydney Smith, Chairman of the East Midlands Gas Board, replying, said that the two Boards exchanged views on many points and worked closely together, but were quite independent and indeed he hinted that there existed a friendly rivalry.

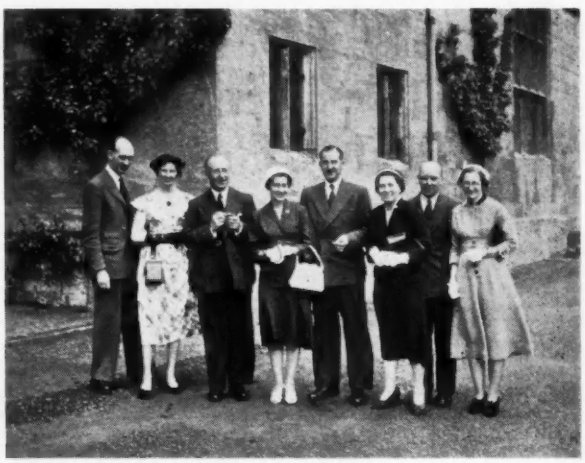
Mr. H. F. H. Jones, in proposing the toast of the Midland Section, congratulated the Section on its very fine record. He stressed the loyalty the gas engineer had for his profession and how necessary it was to maintain their high standards.

Mr. Allen, Chairman of the Section, responded.

The meeting concluded with a visit to the Rootes Group factories at Coventry.

Coventry College of Art is to introduce in September what is believed to be the first training course in authorship of technical publications to be held under the auspices of a local education authority. The college already runs a course in technical illustrating. A high standard of technical education will be required of all students, preference being given to holders of a degree or Higher National Certificate.

SOUTH WESTERN SECTION AT MONTACUTE HOUSE



We are indebted to Mr. W. T. Lane, Development Department of the South Western Gas Board, for these photographs which were taken at Montacute House, Somerset, on June 29 on the occasion of the summer meeting and ladies' day of the South Western Section of the Institution of Gas Engineers. On the left are Mr. T. W. Jackson, Engineer and Manager, Weston/Taunton Division, Mrs. T. W. Jackson, Mrs. T. L. Tallentire, Mr. T. L. Tallentire, Engineer and Manager, Cheltenham. Mr. W. B. Claridge, Chairman of the Section, is seen in the group on the right with some of his colleagues and guests; left to right, Mr. O. Pincock, Mrs. Pincock, Mr. W. B. Claridge, Mrs. A. P. Jennings, Mr. A. P. Jennings, Mrs. Claridge, Mr. P. Whitehead, Mrs. P. Whitehead.

The stars of today...

SHEILA SIM who plays Mary Campbell, stenographer-interpreter and the only girl among thirteen passengers and crew on an adventurous flight from Hong Kong to Tokyo in the Ealing Studios Production "THE NIGHT MY NUMBER CAME UP," directed by Leslie Norman.

. . . are created by public acclaim. Cinema audiences acclaim lovely Sheila Sim, who features in the currently released film "The Night my Number came up"—and housewives acclaim the Century Cooker, which features in thousands of modern kitchens throughout the British Isles. The roles of these two stars in contemporary life are in widely differing fields, but the pre-eminence of both is the result of their fulfilling the exacting demands of their respective roles.

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Lifting Gear Fatality

An inquest was held at Huddersfield on July 6 on Frederick Goodlad, gasworks labourer, who was killed when a 14 cwt. conveyor slipped from a crane on to him at Huddersfield gasworks. Evidence was given that Goodlad was one of a gang of seven men working at the gasworks on June 26. It was part of their job frequently to move a portable conveyor, used for carrying iron oxide from purifying boxes to a tip, by means of an overhead crane. On this occasion, while moving the conveyor, the chain slipped from the hook, precipitating the conveyor on to Goodlad. He appeared to be dead when released by his workmates.

It was stated that the chain supporting the conveyor did not fit the crane hook, but the men were aware of this and were 'very careful of it.' The hook only required to move slightly to one side for the chain to become detached, and this could have happened any time the strain was taken. A bigger chain was now being used and the same sort of accident could not occur again.

After the Coroner had commented that it was a tragedy that the use of dangerous lifting gear should only come to light after a man had lost his life, the jury returned a verdict of death by misadventure.

Gas Bills Paid via V.H.F.

Few authorities have shown more enterprise in the use of V.H.F. mobile radio than the North Western Gas Board. During the rail strike, the Board stationed radio-equipped vans at pit heads so that an emergency road transport service could be directed speedily to vital coal supplies, thus preventing bottle-necks.

Now it has found a new use for its mobile equipment. A van has been fitted-out as a paying-in office, and people living in outlying parts need no longer travel into the centre of the city to settle their gas bills. They just visit the mobile office, which makes regular calls to each area.

The Gas Board, wherever possible, formerly hired halls near large housing estates so that people wishing to do so could pay their accounts there on certain days of each month. The scheme had several disadvantages, not the least of which was the security risk, where large sums of money were involved. Often there was no telephone available, and head office could not be contacted when a discrepancy arose. A Gas Board official commenting on the new scheme said one van is doing the job in the Liverpool area at present, and it appears to be working extremely efficiently. The radio equipment was supplied by the Radio and Transmission Division of the Automatic Telephone & Electric Co., Ltd., and operates in the 80 mc/s wave band.

The Board has two base transmitters—at its Manchester headquarters, and in Liverpool—and about 25 mobile installations. New base stations to serve the Wirral and St. Helens areas are expected to go into operation in the near future.

Gasholders for Australia

The Australian Gas Light Company, Sydney, recently put into commission the first of three 4 mill. cu.ft. spiral gasholders for district storage. The holder is one of the two under construction at the Chullora station, the third being in hand at Eastwood. The contractors for these holders are the German firm of Dinglerwerke Rhein-Pfalz, and the contract is not only for the supply and erection but also for the provision of technical personnel and labour. Up to 50 German workers have been employed on the sites. The holders are the first spiral guided holders to be built by a German firm.

Before letting the contract to Germany every effort was made to place the work in Britain, but without success. The Company's Construction Engineer contacted and, in most cases, made personal calls on builders of spiral gasholders in Britain, giving full particulars of Australian wage rates, penalty rates, material costs, housing conditions, etc., so that all tenderers would be fully aware of the conditions at the sites. A statement issued by the Company says only four British firms submitted quotations and none of these complied with the complete conditions of the specification, nor gave any indication of being able to supply the materials and labour necessary to complete the contract in the time required.

The contract will be completed during 1956 following which the 12.5 mill. cu.ft. column guided holder commissioned in 1917 will be taken out of operation for resheeting of the crown as well as the inner and second lifts.

Tea Equipment Saves £6,000

A remarkable example of large-scale reduction of costs in industrial catering is shown by the recent installation of 33 water boilers for making workers' tea at the B.S.A. factory, Armoury Road, Birmingham. While surveying the factory 12 months ago, a consulting engineer discovered that the 50 old 20-gal. urns used for tea-making, situated at various sections of the workshops, were an uneconomic proposition. Stotts of Oldham were consulted and one of their No. 2 Magna boilers was installed beside one of the urns. Gas and water meters were fitted to the supply lines of both the urn and the boiler, and a series of comparison tests lasting two months were carried out.

During this time, the new boiler proved itself to be far more efficient than the old urn, with the result that 32 more Magna boilers are being installed, bringing about a saving in gas costs estimated at just under £6,000 a year by Mr. W. H. Cole, of the B.S.A. Works Engineer's Department. Due to the ease and simplicity of operation of the new boilers, there has also been a considerable saving in time and manpower.

GAS AT THE ROYAL HIGHLAND SHOW

The large number attending the Royal Highland Show at Corstophine, near Edinburgh, this year, found much to interest them on the Gas Council stand which included a wide range of domestic appliances as well as stressing the services which the industry offers on the farm and in the dairy. The centre-piece of the stand was the demonstration kitchen in which home service advisers from the Scottish Gas Board gave expert guidance on cookery, featuring especially summer dishes. One section of the stand was devoted to large-scale catering equipment—ranges, boilers, steamers, café sets and deep-set fryers—and the dairy section included a pasteurizer and a steam-raising boiler. The domestic exhibits included a special section of coke burning appliances—boilers, stoves, cookers and fires—and a large range of the latest gas cookers, water heaters, refrigerators, fires, washing machines and other laundry equipment was also shown.

AMAL

Calibrated Jets & Injectors

to meet a specification of consumption

AMAL LTD., HOLDFORD ROAD, WITTON, BIRMINGHAM, 6

CRANE

VALVES for Gas, Steam, Water, Oil and Air

WELDING GUNNING SPRAYING OF GAS RETORTS

EB

Write for particulars of how E. B. Service can help in reducing maintenance costs. Manufacturers of all types of Cements.

E. B. REFRACTORY CEMENT CO. LTD.
Oakfield Offices, Brettell Lane, Stourbridge

COMPRESSORS & EXHAUSTERS FOR AIR AND GAS.

See our Advertisement Next Week.

REAVELL & CO. LTD. IPSWICH.

CASES FOR BINDING

Quarterly Volumes of the 'Gas Journal'

7/6 each, post free

Walter King, Ltd., 11, Bolt Court, Fleet Street, London, E.C.4.

"THE DOUGLAS PUMP"

SHEWN FITTED WITH SUCTION PIPE LINE STRAINER, GIVING CHOICE OF TWO SUCTION LINES, PUMP & STRAINER STEAM HEATED. GOOD SUCTION. SLOW SPEED.

WILLIAM DOUGLAS & SONS LTD., PUTNEY - - LONDON, S.W.15.

WESTWOOD & WRIGHTS LIMITED

BRIERLEY HILL, STAFFS.

GASHOLDERS · PURIFIERS · WASHERS
CONDENSERS · CASTINGS · STEELWORK
GAS VALVES · WELDED PIPES

PUBLISHERS' NOTICE

The " Gas Journal " is published every Wednesday, price 1/3d.; by post 1/5d.

Subscription Rates: Home and Empire:—52/- per annum; Foreign:—60/- per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 2/- per line (approx. 7 words)—minimum charge 10/-. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10 in. deep × 7 in. wide; block screen 120.

BUSINESS MANAGER: S. T. CULLEN

MIDLANDS MANAGER: G. B. Torrance, 42, Wychall Lane, King's Norton, Birmingham, 30. *Telephone:* Kings Norton 3868

NORTHERN MANAGER: Philip W. B. King, Flat 1, 7 Langcliffe Avenue, Harrogate. *Telephone:* Harrogate 67625.

SOUTHERN REPRESENTATIVE: A. Engelhardt, 11, Bolt Court, Fleet Street, E.C.4. *Telephone:* Central 2236-7

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.

Telephone: CENtral 2236-7. *Telegrams:* Gasking, Fleet, London.

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DUTCH AND DANISH BOG ORE
SPECIALLY ACTIVATED OXIDE OF IRON

Oxide supplied on loan or sale outright.
Highest prices paid for Spent Oxide

Send your enquiries to

GAS PURIFICATION & CHEMICAL COMPANY LIMITED

ESTABLISHED 1873

PALMERSTON HOUSE, BISHOPSGATE, LONDON, E.C.2.

Telegrams: "Purification, Stock, London." Telephone: London Wall 7938/9 & 7930

THE BRITISH GAS PURIFYING MATERIALS CO., LTD.

NATURAL BRITISH.

BOG (DUTCH and DANISH) ORE.

SPENT OXIDE.

LONDON ROAD, LEICESTER.

Telegrams: "BRIPURIMAT"
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THE COOKER CLEANER

"KLEENOFF"
FIBRE BRUSHES
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"KAY-DEE" *
KETTLE DESCALER

For resale to the public, and in bulk for works use.

BALE & CHURCH, LTD.
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FIRE FIEND
FEARS RAPID, RELIABLE
NU-SWIFT !

Unseen by you, the Fire Fiend searches everywhere for easy prey. Are you well equipped to fight back if he picks on you for his next victim?

Nu-Swift Ltd., 25 Piccadilly London W.1. REG 5724
In Every Ship of the Royal Navy

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KINGS PATENT AGENCY, LTD (Director, B. T. King, A.I.M.E., Patent Agent) Advice, Handbook, and Consultations free. 146a, Queen Victoria Street, London, E.C.4. 'Phone: City 6161.

PUBLICATIONS

GAS ACCOUNT CALCULATORS

SUPPLIED either by Price per Therm or Thousand, for any specified Calorific Value, in book form, office charts, or pocket charts for Meter Inspectors, printed in clear type. Write for particulars to F. H. WAKELIN, LTD., Calculator Specialists, 354, WHEELER STREET, BIRMINGHAM.

'Phone: Northern 0989. 'Grams: Reckoners, B'ham.

DOMESTIC UTILISATION OF GAS

SMITH & LE FEVRE

20/- *inc. postage*

WALTER KING, LTD.

11, Bolt Court, Fleet Street, E.C.4.

APPOINTMENT WANTED

REPRESENTATIVE, fully experienced, recommended by Past President, desires change of Post. Connections with Sales and Distribution sides of the Industry—part-time Representation considered. Apply: No. 246, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is exempted from the provisions of the Notification of Vacancies Order, 1952.

REPRESENTATIVE required by well established manufacturers of instruments widely used in gasworks and in gas distribution to call on gasworks and big gas users in London and Home Counties.

Applicants should have had some training either in gas manufacture or distribution and experience as a representative, not necessarily in instruments as training will be given.

Remuneration by salary. A car is provided and travelling expenses are paid.

This position offers interesting work with plenty of scope in a progressive organisation. Write giving age, details of education and training, previous positions held and remuneration expected, to the Directors, Walker, Crosweller & Co., Ltd., Whaddon Works, Cheltenham.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION
DRAUGHTSMAN, FURNACE AND INDUSTRIAL DEPARTMENT.
SOUTH STAFFORDSHIRE MOND DISTRICT

THE position is a permanent one, and some furnace design experience is desirable.

The salary for the post will be within Grade 7 (£620-£700 per annum) of the National Salary Scales.

The post is pensionable, and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to Mr. A. F. Allen, District Secretary, West Midlands Gas Board, South Staffordshire Mond District, Dudley Port, Tipton, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

NORTH STAFFORDSHIRE DIVISION
DIVISIONAL DISTRIBUTION ENGINEER

APPLICATIONS are invited for the above post, which is located at Stoke-on-Trent.

Candidates should have extensive experience in the laying of cast iron and steel mains for high and low pressure distribution of town gas, involving direct and contract labour, and be fully conversant with maintenance and emergency methods. Experience is also desirable in the design and layout of bulk supply systems, integration, and planning.

The minimum qualification will be the Higher Grade Gas Engineering (Supply) Examination of the Institution of Gas Engineers, or its equivalent.

The commencing salary for the post will be not less than £1,000 per annum.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and details of training and experience, together with the names of two referees, should be addressed to the Industrial Relations Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham, 15, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

(*Classified advertisements continued on page* 158)

It hits you . . .

. . . these days that the only way to sell an appliance or an electrostatic detarrer is to take the thing into your client's office. Which has its difficulties, as you may agree. But then you obviously have not seen the sort of 3-D slides produced by **Walter King Photographs,** who are specialists at the game. Why not see for yourself? Call, write, or 'phone them at 11, Bolt Court, Fleet Street, E.C.4. (CENtral 2236)

APPOINTMENTS VACANT (*ctd.*)

WEST MIDLANDS GAS BOARD

WORCESTERSHIRE-HEREFORDSHIRE DIVISION
DEPUTY ENGINEER AND MANAGER,
REDDITCH GROUP

CANDIDATES, who should be corporate members of the Institution of Gas Engineers, should be familiar by experience with modern gas engineering practice and plant.

The salary for the post will be £975 per annum.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, giving details of training, academic qualifications and practical experience, together with the names of two referees, should be addressed to the Industrial Relations Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham, 15, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

NORTH STAFFORDSHIRE DIVISION
DEPUTY ENGINEER AND MANAGER
STAFFORD DISTRICT

CANDIDATES must be corporate members of the Institution of Gas Engineers, and should have had experience in the operation and control of continuous vertical retort plant, C.W.G. manufacture, ancillary processes, and gas distribution. The present output of the Undertaking is 1,000 million cubic feet per annum.

The salary will be £975 per annum.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to the Industrial Relations Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham, 15, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

WARWICKSHIRE DIVISION
TECHNICAL ASSISTANT, HINCKLEY DISTRICT

CANDIDATES should have received training and experience in all branches of modern Gas Works practice, chemical and production plant control.

The salary will be within Grade 4 (£365-£555 per annum) of the National Salary Scales.

The post is pensionable, and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and particulars of training and experience, together with the names of two referees, should be addressed to Mr. A. Allen, Divisional General Manager, West Midlands Gas Board, Gas Street, Coventry, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

A QUALIFIED GAS FITTER is required by the Research & Development Division of the Calor Gas (Distributing) Co., Ltd., Coombelands, Addlestone, Surrey. Applicants must have experience of all gas appliances and of the use of copper tubing. Ability to drive and/or fitting shop experience would be an advantage, but not essential. Wages will be on a par with standard scales. Successful applicant will be eligible for the company's non-contributory superannuation scheme, bonus scheme and free midday canteen. State full details of qualifications, experience, age, together with three names as references.

APPLICATIONS are invited for the post of GENERAL MANAGER of new Low Temperature Carbonisation Plant now in course of erection at Edwinstowe, Nottinghamshire. Plant when completed will carbonise 250 tons of coal per day, increasing in a few years to 500 tons per day. Applicants, preferably between 30 and 45 years of age, should have good technical qualifications and experience in either the coke oven or gas industry.

Salary range £850 to £1,250 according to qualifications and experience.

Applications, including details of age, education, qualifications, experience, and also giving an indication of present salary, should be addressed in confidence to the Managing Director, Midland Rexco, Ltd., Mansfield Colliery, Mansfield, Notts.

NORTH WESTERN GAS BOARD

WIRRAL GROUP
DISTRICT SERVICE MANAGER—BIRKENHEAD

APPLICATIONS are invited for the above pensionable appointment at a commencing salary of £1,175 per annum.

The person appointed will be responsible for all aspects of consumer service within the area of the Birkenhead Undertaking including the organisation of appliance installation and servicing staffs, control of showrooms and general administrative co-ordination. He will also be responsible for Appliance and Meter repair shops.

Applications, giving details of previous training and experience, together with the names of two referees, should reach the General Manager, N.W.G.B., Wirral Group, Gas Offices, Hind Street, Birkenhead, within fourteen days.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION
FIRST CLASS GASFITTER—MARKET HARBOROUGH

THERE is a vacancy for a FIRST CLASS GAS-FITTER at the Market Harborough Undertaking (Provincial A.). Service Occupancy of a flat is available on reasonable terms.

Applications are invited and these, stating age and giving details of education, qualifications and experience, together with the name of a referee, should be addressed to reach the undersigned not later than Wednesday, July 20, 1955.

H. B. TAYLOR,
Divisional General Manager.

Millstone Lane,
Leicester.
July 4, 1955.

EAST MIDLANDS GAS BOARD

CHIEF INSTRUCTOR—AREA TRAINING CENTRE

APPLICATIONS are invited for the position of CHIEF INSTRUCTOR at the Board's Area Training Centre, Long Eaton, near Nottingham. The commencing salary will be in the region of £1,000 per annum.

Courses at the Training Centre are conducted for all classes of employees although the preponderance of courses is concerned with the Board's sales and service policy and practice. In addition to the Chief Instructor and an Assistant Instructor, lecturers are drawn, as required, from officers of the Board and from outside sources. The successful candidate will be expected to have the following:

1. An advanced knowledge of the sales and service and distribution sides of the Gas Industry including possession of the Higher Grade Certificate in Gas Engineering (Supply) or the equivalent associate membership examination of the Institution of Gas Engineers; and the Final Certificate in Gas Fitting of the City and Guilds of London Institute.
2. A real interest and experience in giving instruction.
3. The ability to administer the Centre and all courses conducted there.

The position is pensionable and the successful applicant will be required to pass a medical examination.

Applications stating age, education, qualifications, present appointment and previous experience, together with the names of two referees, should be sent to the undersigned within two weeks of the date of this notice.

A. GWYNNE DAVIES,
Secretary.

Beverley House,
University Road,
Leicester.
July 4, 1955.

SOUTH EASTERN GAS BOARD

DRAUGHTSMAN, SPECIAL SERVICE DEPARTMENT, 709, OLD KENT ROAD, S.E.15

APPLICANTS must be capable of making general arrangements and detailed drawings of industrial equipment. Experience in the design of gas burning appliances desirable but not essential.

Preference will be given to applicants having the Higher National Certificate in Mechanical Engineering.

Commencing salary within Grades 7-8 (Met. Area) £650-£770 p.a., according to qualifications and experience.

Applications in writing, quoting reference V10/562 and giving full details should reach the undersigned within fourteen days.

R. J. MCCRAE.
Personnel Manager.

Katharine Street,
Croydon.

NORTHERN GAS BOARD

WESTERN GROUP
PENRITH DIVISION
ASSISTANT MANAGER—KESWICK UNDERTAKING

APPLICATIONS are invited for the position of ASSISTANT MANAGER of the Keswick Undertaking.

Candidates should be trained in the control of Gas Works plant and in routine laboratory tests.

The commencing salary will be within A.P.T. Grade VI (£565-£645 per annum) of the National Scales for Gas Staffs.

The successful candidate will be required to pass a medical examination and to join the Board's Staff Pension Scheme.

Applications stating age, experience, qualifications, together with the names of two referees, should be addressed to the Divisional General Manager (Penrith Division), 19, King Street, Penrith, within 14 days of this advertisement.

A. R. CROFT,
Group General Manager.

50, Castle Street,
Carlisle.
July 5, 1955.

SCOTTISH GAS BOARD

GLASGOW DIVISION
(GLASGOW DISTRICT)
SALESMEN

APPLICATIONS are invited for two SALESMEN Salary A.P.T. 6—£565-£645 per annum.

Preference will be given to holders of the Institution of Gas Engineers Certificate in Gas Salesmanship and Consumer Service.

Applications, stating age, experience and qualifications should be submitted to the undersigned not later than fourteen days after publication of the notice.

D. F. YOUNG,
Divisional Controller.

July 8, 1955.

SOUTH WESTERN GAS BOARD

BRISTOL/BATH DIVISION
APPOINTMENT OF CHEMIST

APPLICATIONS are invited for the position of WORKS CHEMIST within the Division—initially at the Bath works.

The duties would include deputising for the Senior Chemist. Applicants should be familiar with all Gas Works Chemical Tests and Chemical Control of Plant.

Possession of the Higher National Certificate in Chemistry is desirable, and the Ordinary National Certificate is a minimum qualification.

The salary will be within Grade A.P.T 7 (£620-£700) of the scale of the National Joint Council for Gas Staffs.

Applications should be received by the undersigned not later than Wednesday, August 3, 1955.

CHARLES R. INGHAM.
Production Engineer and Manager.

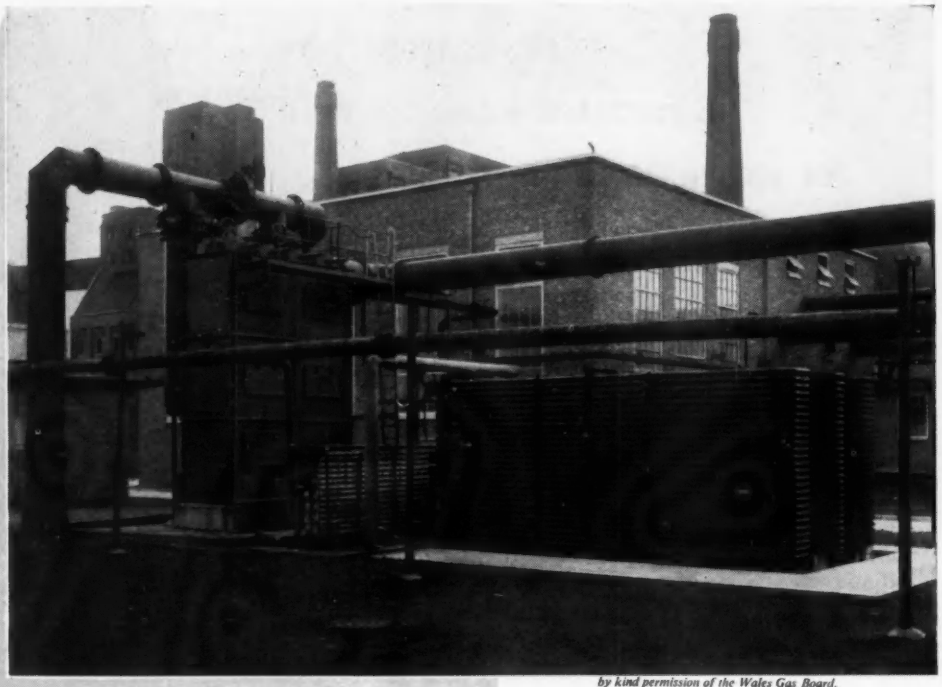
Radiant House,
Bristol 1.

AGENCY

AGENT with live connections amongst Groups of Wales Gas Board to represent recognised manufacturers of proprietary Gas Cookers, etc.

New and approved models should offer an attractive appointment.

State age, and present connections, to No. 24[illegible] *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.



by kind permission of the Wales Gas Board.

Gas Dehydration by Holmes

Gas Dehydration Plant recently installed at Maelor Gas Works. Capacity 5,000,000 cu. ft. per day.

W. C. HOLMES & CO. LTD

FOUNDED 1850
HOLMES
HUDDERSFIELD

Please write for publication No. 38/5

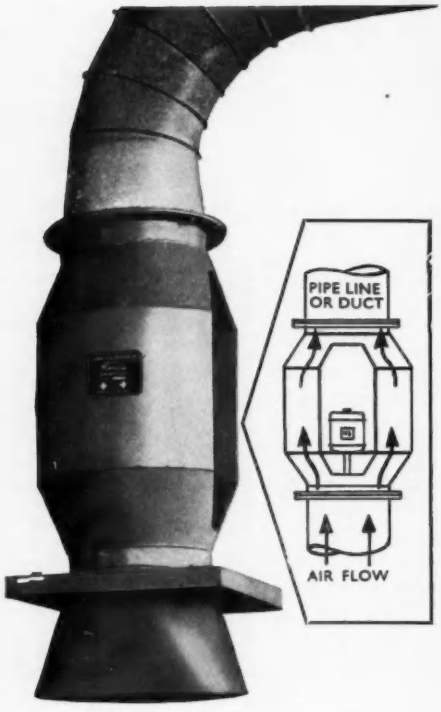
TURNBRIDGE · HUDDERSFIELD

C4703

the reasons why
Bifurcated Fans are used
for extracting Fumes and Gases

from FUME CUPBOARDS · DE-GREASING, DE-SCALING and
DE-OXYDISATION BATHS · PICKLING and NEUTRALISING TANKS
IMPREGNATING TANKS · PAINT SPRAY BOOTHS
FURNACES and FORGE PRESSES · CONFECTIONERY and BAKING OVENS

BECAUSE within the operational range of these units no other fan compares for price, design simplicity and economy of space. Bifurcated fans are direct driven units which will handle obnoxious fumes and gases up to 350° F. Their easily accessible K.B. made, totally enclosed and weatherproof motors are completely isolated from the fumes or gases handled.
Ranging up to 25″ diameter, the sizes are matched to commonly used pipes and ducts. 10″, 12″, 14″, 16″ and 19″ fans are held in stock. If you want full details of this exclusive fan type write now for Publication No. 28/7

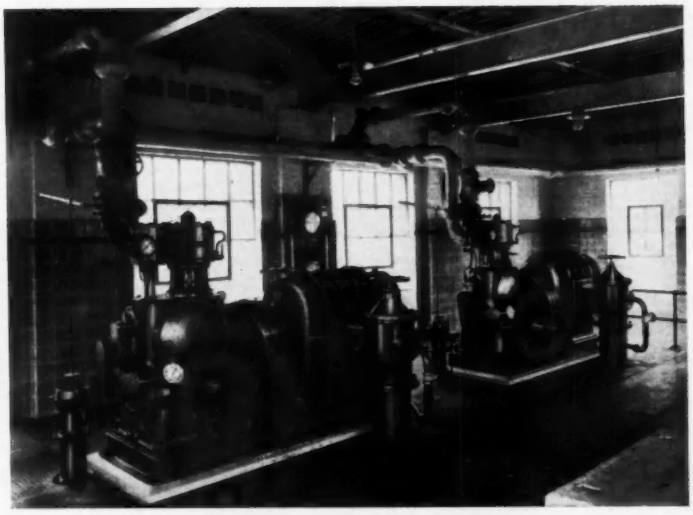


Keith Blackman Ltd
MILL MEAD ROAD, LONDON, N.17
Fan Makers to the Chemical Industry

T.A.7164/60s

SISSON STEAM ENGINES
FOR LONG PERIOD CONTINUOUS RUNNING

DESIGNED for driving EXHAUSTERS BOOSTERS COMPRESSORS ETC.



COMPACT STURDY and RELIABLE

SUITABLE for GAS GOVERNOR or AUTOMATIC CONTROL

Telegrams: SISSON

W. SISSON & CO., LTD.
GLOUCESTER, ENGLAND.

Telephone: 22295-6

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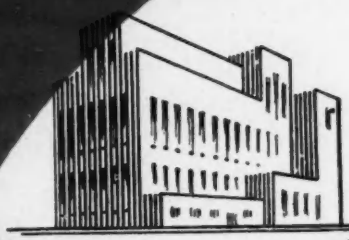
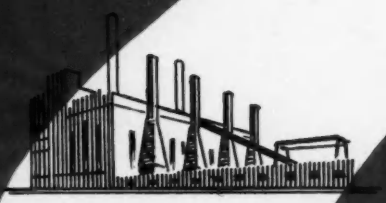
Two sides to the question . .



CONTINUOUS

OR INTERMITTENT



. . one answer WEST'S

GLOVER-WEST CONTINUOUS VERTICAL RETORTS

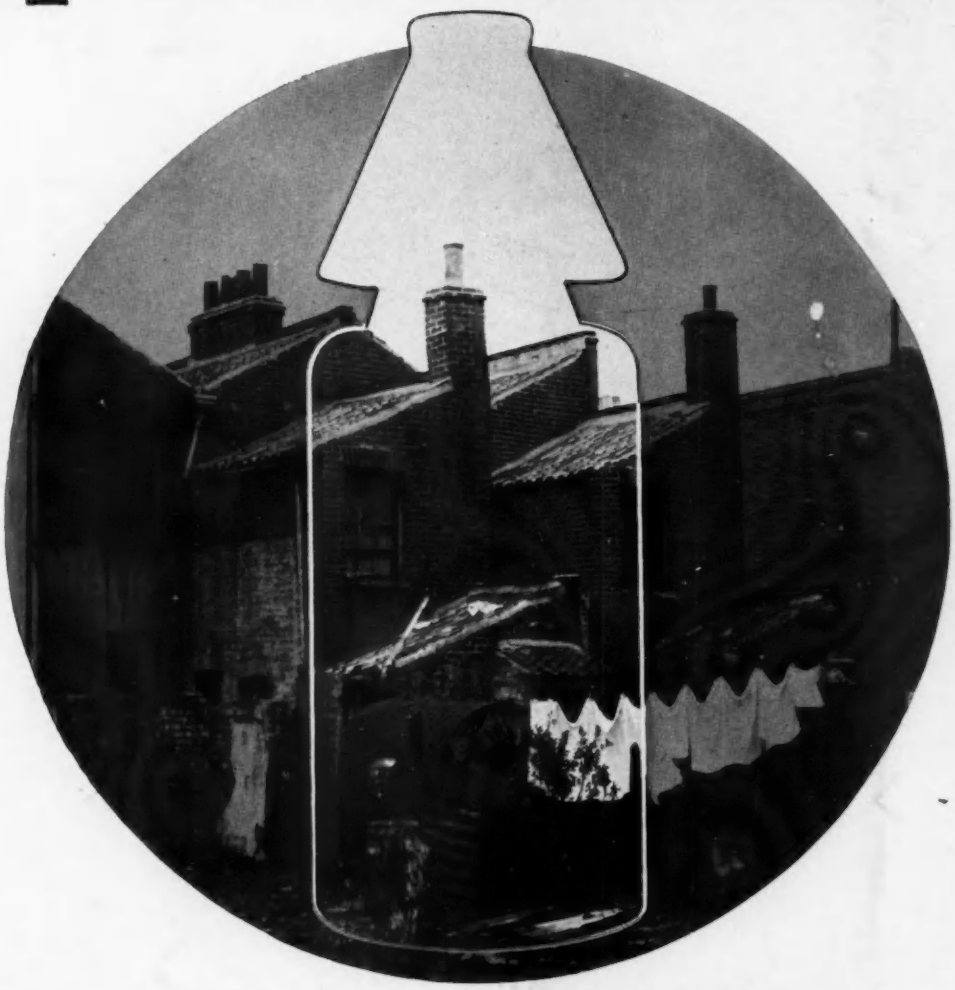
C·O·L INTERMITTENT VERTICAL CHAMBERS

WEST'S GAS IMPROVEMENT COMPANY LIMITED

Albion Ironworks, Miles Platting, Manchester 10. Telephone: COLlyhurst 2961

London: Columbia House, Aldwych, W.C.2. C.O.L. Division: Cheadle House, Buckingham Gate, S.W.1.

Operation Rescue



and ASCOT

Since one of the important objectives of Operation Rescue is the provision of a hot water supply, the merits of the Ascot system will come under review when plans for improvement or conversion are considered.

It will be found in many cases that the most economical and efficient method of providing hot water will be an Ascot — a multipoint, a bath water heater, or a sink water heater, or perhaps a combination of the last two.

Ascot heaters are, for the service they give, inexpensive to buy. Often they are cheaper to install than some other popular systems because the pipe runs are simple.

They do not burn raw coal, which is in the interests of the householder, his neighbours, and the whole nation.

Because they heat only the water actually required Ascots are economical in use.

Finally, and really most important, they give the householder a first-class hot water service from which he and his family can get piping hot water instantly day or night in an endless flow. Only of an instantaneous gas water heater can it be said that

ASCOT

It never runs cold

The Ascot Technical Department offers full co-operation, and invites inquiries

ASCOT GAS WATER HEATERS LIMITED · 255 NORTH CIRCULAR ROAD · LONDON · NW10

WHG/A.101